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NEW YORK STATE

COMMISSION ON THE ST. LAWRENCE
SHIP CANAL PROJECT

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84
STATE OF NEW YORK

PRELIMINARY REPORT

OF THE

**Commission Created Pursuant to Chapter
Eight Hundred and Six of the Laws
of Nineteen Hundred and Twenty**



ALBANY
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REPORT

To the Legislature of the State of New York:

The commission created pursuant to Chapter 806 of the Laws of 1920, to represent the State of New York at hearings before the International Joint Commission on Boundary Waters, created under and by virtue of Article 9 of the convention concluded on January 11, 1909, between the United States and the Dominion of Canada, hereby respectfully submits the following preliminary report:

The commission was duly organized by the appointment of a chairman and vice-chairman. The commission held meetings and made investigations at different places throughout the United States. As a result of its deliberations the commission, on or about the 29th day of December, 1920, submitted to such International Commission a brief, which reads as follows:

INTERNATIONAL JOINT COMMISSION ON BOUNDARY WATERS

In Matter of Improvement of the St.
Lawrence River between Montreal
and Lake Ontario, and matters
incidental thereto.

Memorandum and Points submitted by the New York State Commission in relation to the Improvement of the St. Lawrence River between Montreal and Lake Ontario, and in relation to other matters incidental thereto, which are involved in the St. Lawrence River improvement investigation of The International Joint Commission on Boundary Waters.

STATEMENT

Much data in relation to the matters under investigation have already been submitted to the Honorable Joint Commission at Buffalo, Albany, N. Y., Boston, Montreal and elsewhere, and the attention of the Honorable Commission is most respectfully called thereto.

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(RECAP)

No attempt will be made to re-present any part of such data in this document. The questions involved are so large and far reaching that they must receive serious consideration.

Therefore they cannot be approached except with open minds and a willingness to give full consideration to all aspects of the questions involved. Evidently that is the attitude of members of the Honorable International Joint Commission, as it ought to be the attitude of the citizens of the two nations, which have undertaken the investigation.

The St. Lawrence River is the international boundary from Tibbets Point at the outlet of Lake Ontario to St. Regis, a distance of 113 miles. The upper section comprises the open stretch of river from Lake Ontario to Ogdensburgh, in which there is free navigation for lake vessels, a distance of 62 miles.

The next section extends from Ogdensburg to St. Regis, a distance of 54 miles. Below St. Regis the St. Lawrence flows wholly within Canadian territory. The distance from St. Regis to Montreal is 66 miles. Montreal is at the head of tide water and is reached by ocean going vessels.

Montreal is 873 nautical miles, or 1,005 statute miles, from the sea via the northerly Belle Isle route, and 692 nautical miles, or 797 statute miles, from the sea via the southerly Cabot Strait route. The distance from Lake Ontario to the sea is about 1,180 miles, for nine-tenths of which distance, that is, from St. Regis to the Gulf of St. Lawrence, the river flows wholly within Canadian territory.

The distance from Lake Erie to the outlet of Lake Ontario is approximately 185 miles. The entire distance of Lake Erie from the sea via the Welland Canal and the St. Lawrence River is approximately 1,373 statute miles.

The distance from Port Colbourne, the upper end of the Welland Canal, to Fort William is 852 miles; to Duluth 974 miles, and to Chicago 876 miles. These ports are more than 2,200 miles from the ocean. Lake Superior is 601 feet above the level of the sea. That elevation must be overcome by steaming up against the strong currents in the St. Lawrence, Detroit, St. Clair and St. Mary rivers and locking up through twenty or more locks with all the delays incident thereto.

POINT I

NO. ECONOMIC ADVANTAGES IN A SHIP CANAL DOWN THE
ST. LAWRENCE

The saving in distance via the St. Lawrence route over the New York route from Duluth to Liverpool is only 408 miles; from Fort William to Liverpool is only 492 miles; from Chicago to Liverpool only 491 miles; and from Buffalo to Liverpool is only 492 miles; whereas the saving in distance between such lake ports and Southampton is about one-half of the above savings. To French and other South European ports the distance is as great or greater from such lake ports via Montreal than via New York.

The physical obstacles to navigation in the St. Lawrence route, which nature has interposed, are far more serious than such differences in distance or other inconveniences of the New York route, and such obstacles will be none the less when dams and locks are constructed to still further retard and make still more expensive the navigation of the St. Lawrence.

It must be born in mind that only the upper and lower reaches of the river are navigable, the former for Great Lakes vessels from Lake Ontario to Ogdensburgh, a distance of 62 miles, and the latter from Montreal to the sea, a distance of 1,005 miles via the Belle Isle route, which is the shorter of the two St. Lawrence routes to Liverpool by approximately 300 miles, but which route is closed by ice floes to navigation earlier in the fall and is cleared of ice later in the spring than is the southern, Cabot Straits, route.

The channel of the St. Lawrence below Montreal is 30 feet deep and 450 feet wide in the straight portions and 600 to 750 feet wide in the bends between Montreal and Quebec, a distance of 160 miles; but it has a width of 1,000 feet in the first 170 miles below Quebec nearly to Father Point, which is 181.6 miles from Quebec. For the remaining distance of 673 miles the river broadens out and flows into the Gulf of St. Lawrence.

The channel from Lake Ontario to Ogdensburgh is deep enough for ocean going vessels, but it passes between islands and is somewhat tortuous. In the 68 miles from Lake Ontario to Galop

Rapids the fall is only about one foot, but in the succeeding 48 miles, comprising the Galop, Farrans Point, Long Sault and other rapids, the aggregate fall is 91 feet, the major part of which is within the $11\frac{1}{2}$ miles of the Long Sault Rapids where the fall is 48 feet. Through all these rapids the natural channel is very tortuous and the cross currents are swift and they will be difficult to confine and hold in check. In the 30-mile reach of Lake St. Francis the water is deep enough for lake or ocean going vessels. In the Soulanges section of 14 miles occur the Coteau, Cedar and Cascade rapids with a total fall of 84 feet. Below them is the Lake St. Louis, 16 miles long, with depth enough for any ocean going vessel. The Lachine Rapids are $8\frac{1}{2}$ miles long and have a total fall of 45 feet.

At Galop Rapids, 3 miles long, the fall is 10 feet; from Galop Rapids to Ogdens Island the distance is 8 miles and the fall is $9\frac{1}{2}$ feet; the channel is very tortuous; from Ogdens Island to Bradfords the distance is 11 miles and the fall is $18\frac{1}{2}$ feet; from Bradfords Point to Richards Bay the distance is 7 miles and the fall is 3 feet; from Richards Bay to Massena Point the distance is $11\frac{1}{2}$ miles and the fall is 48 feet; from Massena Point to St. Regis the distance is $6\frac{1}{2}$ miles and the fall is $2\frac{1}{2}$ feet.

The total fall of water along the International boundary is 92 feet, and below that boundary and wholly within the Dominion of Canada the total fall is 129 feet, of which 84 feet is in the 14 miles reach of the Coteau, Cedar and Cascade rapids, and 45 feet is in the $8\frac{1}{2}$ miles reach of the Lachine Rapids. The total fall to the St. Lawrence River at Montreal from Lake Ontario, whose mean elevation above the sea is approximately 244.53 feet, is approximately 221 feet. The elevation of the St. Lawrence at Montreal is 23.1 feet above the ocean, but only 14.73 feet above mean tide at New York City, the standard adopted by the United States Lake Survey in 1880. Profile maps of the St. Lawrence River between Lake Ontario and Montreal, of which the distance is 179 miles, will show many islands, tortuous channels and in some sections waters several miles in width. For much of the distance the banks and shore slopes are gradual and easily flooded. In their Report of 1900, at page 404, the Board of Engineers on Deep Waterways said

that "Ice jams in the vicinity of St. Regis Island occur during the winter months, occasionally beginning in December or extending into April. The rise of water is generally from 10 to 20 feet above standard low water."

At Cornwall, Lock No. 15, the elevation of water for several years averaged from 20 to 30 feet above standard low water. Who can foretell the extent of ice jams resulting from the construction and maintaining of dams across the St. Lawrence and the consequent damages to property resulting from the obstruction of the floes of ice, causing the same to back up for miles as it has done in the past? Evidence of that was presented at the New York hearing in October in the form of a copy of a document prepared by Dominion representatives and presented to a Committee of the House of Representatives in Washington. The upper as well as the lower reaches of the St. Lawrence are subject to the extensive and frequent ice floes from November until the river is frozen over. Below St. Regis the river is wholly north of the 45 degrees of north latitude, where the winters are long and severe and the lower 1,000 miles of the river is practically closed to navigation for about six months of the year. In "a Memorial Concerning the Furr-Trade of the Providence of New York," presented to his Excellency William Burnett, Captain-General and Governor by Cadwallader Colden, Surveyor-General of the Province, dated on the 10th day of November, 1724, Mr. Colden said that "notwithstanding all these advantages (which he had enumerated) the French labor under difficulties that no art or industry can remove. The mouth of the river of St. Lawrence, and more especially the Bay of St. Lawrence, lies so far north, and is thereby so often subject to tempestuous weather and thick fogs, that navigation thereof is very dangerous and never attempted but during the summer months.

"The wideness of this bay, together with many strong currents that run in it, the many shelves and sunken rocks, that are everywhere spread over both the bay and river, and want of places for anchoring in the bay, all increase the danger of this navigation; so that a voyage to Canada is justly esteemed much more dangerous than to any other part of America. The many shipwrecks that happen in this navigation are but too evident proofs of the truth of this."

Notwithstanding all the precautions taken since that time many ships have been wrecked in the gulf and river of St. Lawrence. It is known as the "Grave-yard of the Atlantic."

In 1837 the *Albeuria* foundered in the gulf of St. Lawrence and 525 lives were lost; in 1840 the steamer *Dundee* was wrecked and 292 lives were lost; in 1857 the steamer *Montreal* was lost 15 miles above Quebec with 253 lives; in 1898 the French liner, *La Bourgoigne*, was in collision off Sable Island and 584 lives were lost; in 1914 the Canadian-Pacific liner, *Empress of Ireland*, was in collision with the collier, *Storstad*, in the St. Lawrence River near Father Point and sank in 20 minutes, and upwards of 1,000 lives were lost. The commission which investigated that unparalleled disaster found that the navigation of the St. Lawrence is attended with the constant probability of fogs. Captain Kendall said "it was very foggy," and although the officers of the two vessels saw each other's vessel approaching, the fog settled down so suddenly that they were lost to each other's view and the collision occurred. It will be remembered that the loss of the White Star steamer *Titanic* in 1912 after colliding with an iceberg resulted in the loss of 1,500 lives. That disaster occurred, however, off the banks in the region of icebergs, which is in the usual route of vessels passing between Liverpool and the Gulf of St. Lawrence.

Other disasters have occurred in the navigation of the River and Gulf of St. Lawrence, all of which tend to confirm the truth of the statements of navigators, in effect that the navigation of those waters on account of the constant menace of fogs, snow and ice is most hazardous. This is borne out by the marine insurance rates, which increase from midsummer until November, when insurance cannot be had at any rate and thereupon insurance ceases altogether. Notwithstanding all the physical obstacles to be overcome, engineers may be able to construct prisms, dams and locks adequate to accommodate ocean going vessels of 25 or 30 feet draft between Lake Ontario and Montreal, provided they be given money enough and sufficient time to prosecute the undertaking.

Nothing quite like it, however, has hitherto been attempted. The Panama Canal is about 40 miles long, and one-half its length

is through Gatun and Miraflores Lakes. That involved no such engineering problems as will the construction and operation of dams and locks from the beginning of the Galop to the lower end of the Lachine Rapids in the St. Lawrence River, with all the crooks and turns and other obstacles to be overcome. Some of the difficulties of such an undertaking were reported on by the Board of Engineers on Deep Waterways between the Great Lakes and the Atlantic tide waters in 1900. See House Document No. 149 of the Second Session of the Fifty-sixth Congress.

Who can foresee all the exigencies that may arise, necessitating the alteration of plans as the work progresses and the reconstruction of parts that may be injured as the work goes on?

Will the people of the United States forget how much more the Panama Canal cost than was the estimate therefor when that project was authorized? The cost of nearly all public works exceeds and occasionally is twice the estimates. Be this as it may, the difficulties of construction are not all the objections to that project. With such improvements of the St. Lawrence completed, the difficulty of navigating an ocean going vessel up through the ice-flown and befogged St. Lawrence, and especially up through the Lachine, Soulanges, Long Sault and Galop canalized sections of the river with its short bends, cross-currents, that will necessarily be encountered with their dozen or more ship-locks, has never been told and can only be imagined by experienced navigators.

The difficulties of and the delays attending the navigation of the Suez, the Corinthian, the Kiel, the Amsterdam, the Manchester and the Panama ship canals are incomparable with the difficulties of and delays attending the navigation of the series of ship canals to be constructed between Galop Rapids and Montreal.

In addition to all such obstacles will be the difficulties of and delays in navigating the Welland Canal, 25 miles long, with its 7 locks, each of 46½ feet lift; the Detroit River, 31 miles long; the St. Clair Flats Canal, St. Mary's River, one of whose channels is 63 miles long and the other 75 miles long.

The entire waterway from the Gulf of St. Lawrence to Duluth, except through the open waters of Lakes Ontario, Erie, Huron and Superior, consists of narrow, restricted and much of the

way of tortuous channels, wherein the navigation by ocean going vessels is difficult and very costly on account of the delays incident thereto.

Owners of ships do not seek such waterways for profitable navigation. On the contrary, they prefer the open sea, where there are no limitations as to speed, nor restrictions as to width and depth of channels and no locks intercepting the courses of their vessels.

In their report of 1900, *supra*, the Board of Engineers on Deep Waterways discusses the reduction of speed on account of the difficulty of steering a ship in a restricted waterway as well as on account of other causes, such as the area of a cross-section of the prism, the depth of water under the vessel and the regulations prescribed for vessels, navigating such restricted channels and in the passing through the locks. All such physical and regulatory conditions impede the passage of vessels between ports and augment the expense of operation. This is illustrated in the navigation of ship canals generally.

The limit of speed through the Suez Canal is from 5.75 to 6.1 miles per hour; through the Amsterdam Canal, to 5.6 miles per hour; through the Kiel Canal, to 6.2 miles per hour; through the Manchester Ship Canal, to 6 miles per hour, and through the Panama Canal to 8 miles per hour.

All these, except the Manchester and Panama Canals, are practically sea level canals with very little lockage, and still the speed is less than one-half the speed of ocean going vessels in the open sea. Whereas the inland waterway from the Gulf of St. Lawrence to Duluth, which is 602 feet above the sea, will have 20 or 21 locks of varying lifts; several of them will have lifts of 46½ feet. One or more other locks may have still greater lifts. Most of them, however, will have smaller lifts, but all will greatly retard vessels in their passage into and out of the St. Lawrence and the Great Lakes. The total elevation to be overcome by locks is 602 feet.

The Board of Engineers on Deep Waterways in their report of 1900, *supra*, estimated the minimum time of lockage of two vessels in one lockage in a 21-foot waterway at 52.7 minutes, making the average time per ship 26.35 minutes; and in a 30-foot

waterway at 60.3 minutes, making the average time per ship 30.15 minutes. However, that average time per single ship would not avail the owner anything for his vessel would be delayed the full 52.7 minutes in the smaller waterway and the full 60.3 minutes in the larger waterway. The averages are given to show the tonnage capacity of the locks rather than the time consumed by any single vessel in any such lockage. These lockages are the minimum times required when there are no delays to ships in entering the locks. The Board of Engineers on Deep Waterways also reported that the delays to ships while awaiting lockage at the three locks at St. Mary's Falls in 1897 averaged only $\frac{1}{4}$ of an hour, while in 1894 the delays averaged $3\frac{1}{2}$ hours for each vessel, and that "similar delays will occur at the Galop Rapids lock to ships bound east." Such delays are due to heavy weather, congestion of vessels at the locks, breaks in the locks, the blockage of the waterway by sunken vessels and flooding the locks, or in some cases to breaks in the banks or walls of the prisms. In such swift, turbulent waters as those of the St. Lawrence with their cross-currents, whirling eddies, sharp turns and many rapids, breaks are inevitable in artificial structures, such as dams, locks and prisms, far more so than in such canals as the Panama, where the waters consist of lakes at rest, and such rivers as the Chagres River.

Notwithstanding all the safeguards used in the Panama Canal, slides and breaks have occurred, interrupting its use for months at a time and resulting in long delays to its navigation and entailing heavy expenses upon the government.

Floods, fogs and flocs of ice are natural phenomena which, as Cadwallader Colden said of the St. Lawrence in 1724, "no art or industry can remove." Fogs and flocs of ice are frequent in the St. Lawrence.

The Board of Engineers on Deep Waterways, *supra*, said: "the St. Lawrence River from Tibbets Point to the foot of Lake St. Francis, a distance of 142 miles, has a fall of 93 feet, distributed in rapids and river slopes under conditions which make any project for the improvement of the river for deep-draft vessels difficult and expensive. * * * The navigable channel through the Thousand Islands and Brocks Group, as shown on

the charts, is from 40 to 120 feet deep, but in places is less than 500 feet wide, and in case the river should be improved for 30-foot navigation, it is possible that points of rocks above grade may be found within the limits of the channel, which have not been located by previous surveys. No estimate has been included for this section of the river. * * * From Richards Point through Long Sault Rapids to the mouth of Grass River at the head of Cornwall Island (10.6 miles) there is a fall of 48 feet, which it is proposed to overcome by constructing a canal of standard cross-section through the flat country to the south of the St. Lawrence River with a lock of 48 feet lift near the lower end."

This latter proposal the Chief of Engineers in House Document No. 1591, page 21, of the Sixty-fifth Congress, Third Session, said, in effect, was rendered impracticable on account of the water power development there by the St. Lawrence River Power Company.

Colonel James G. Warren, in his report to the Chief of Engineers of the United States Army, House Document No. 1591 of the Sixty-fifth Congress, Third Session, at pages 26-27, said: "But assuming that such ocean connection (between the Great Lakes and the Atlantic ocean) to be assured, the use by ocean going vessels would still be largely governed by the depths of the harbors and connecting waters of the Great Lakes, which under existing projects for improvements, provide depths of 19 to 20 feet at low water, as compared to 25 feet depth in the enlarged Welland and proposed St. Lawrence River Canals."

"It is, therefore, to be stated that the full use of the proposed United States St. Lawrence Ship Canal would still be dependent upon large expenditure by the United States on Great Lakes harbors and channels while, on the other hand, the existing harbors and channels provide for seaboard Great Lakes navigation by ocean going and lake vessels of 20 to 22 feet draft, which admit of extensive commerce.

The present needs of commerce are now reasonably provided for, and as to prospective needs of commerce, there is no evidence of any material development of a greater commerce than at present."

The question of deepening the harbors and connecting waters of the Great Lakes has been unfavorably considered, as set forth in House Document No. 755 of the Sixty-fifth Congress, Second Session, and brings out that such deepening would involve an expenditure so great as to make it not advisable at the present time.

In 1900 George Y. Wisner, of the Board of Engineers on Deep Waterways, said (26 Proceeding of American Society of Civil Engineers, p. 992) that the total cost of deepening the connecting channels and harbors of the Great Lakes would be \$7,000,000 for each additional foot in depth and the annual charges for maintenance would be \$245,000 for each additional foot in depth. Since 1900 the cost of all such work has greatly increased. It may now be assumed that such work would cost at least \$12,000,000 per foot for each additional foot in depth, and the annual charge for maintenance would be \$450,000 for each additional foot in depth.

If the channels be widened as well as deepened, the cost now may be twice the cost estimated by Mr. Wisner in 1900.

For the foregoing and other reasons, Colonel Warren disapproved of any improvement of the St. Lawrence from Lake Ontario to the Canadian border, suitable for navigation by ocean-going vessels, and his report was approved on December 9, 1918, by Major-General William M. Black, Chief of Engineers, and transmitted by the Secretary of War to the House of Representatives and became House Document No. 1591 of the Sixty-fifth Congress, Third Session.

In compliance with a direction contained in the River and Harbor Act of June 3, 1896, directing the Secretary of War "to cause to be made, accurate examinations and estimates of cost of construction of a ship canal by the most practicable route, wholly within the United States, from the Great Lakes to the navigable waters of the Hudson River of sufficient capacity to transport the tonnage of the lakes to the sea, in 1897 the engineers made an exhaustive investigation of the physical conditions of several routes, the engineering problems involved in each, the economic advantages claimed for such a waterway and other matters incidental thereto. Major Thomas W. Symons had per-

sonal charge of the investigation and his reports, with accompanying maps, approved by the Chief of Engineers, comprises a hundred pages or more of House Document No. 86 of the Fifty-fifth Congress, First Session, which was transmitted by R. A. Alger, Secretary of War, on July 15, 1897.

Among the conclusions reached by the United States Army Engineers, and stated in that report at page 109, is the following: "For the highest economy in transportation, special types of vessels are needed for use on the ocean, on the lakes and on the canals, and neither can replace the other in its proper waters without suffering loss of efficiency. Ocean vessels could not, as a general rule, engage in the business of passing through a ship canal and the lakes to upper lake ports; and lake vessels are not fitted for use on the ocean, and if they made use of a canal, they would have to transfer their cargoes at the seaboard. For economical transportation through a canal from the Great Lakes to the sea, special vessels, differing from and far less costly than ocean or lake vessels, are required."

At page 110 of that report occurs the following:

"If a ship canal were built, the business thereon would not be done in large lake or ocean vessels, but in barges and boats, which could be equally well accommodated in a canal of much less size."

These conclusions were reached after exhaustive investigation into the matter in all its phases and nothing has occurred since that time to raise any question as to their soundness. But subsequent investigations have confirmed and strengthened them.

The Roosevelt Commission of 1900, headed by General Francis V. Greene, made a thorough investigation of the subject of a ship canal between the Great Lakes and the ocean, and in its report stated:

"There are certain insuperable difficulties in the way of such a canal ever being a success, no matter by whom constructed. It is intended to be used by vessels which can navigate the ocean, the canal and the lakes. We do not believe that such vessels can be constructed so as to be economically a commercial success. The ocean vessel is

built to withstand the fierce storms of the Atlantic and costs in its most modern type about seventy-one dollars per ton of carrying capacity. The vessel that can navigate the lakes is built to withstand less frequent and dangerous storms; it has less draft on account of the smaller depths of the harbors on the lakes and is built much less substantially; its cost is about thirty-six dollars per ton of carrying capacity. The cost of a canal fleet, consisting of a steamer and three consorts, with a total capacity of 3,900 tons, according to figures furnished us by boat builders, will be \$28,500 or \$7.31 per ton."

Those estimates, made in 1900, as to the cost of the three types of vessels are undoubtedly much too low, but the ratio of the cost of each has not greatly changed as is shown by Mr. Adam E. Cornelius in his address recently forwarded to the International Joint Commission.

The report of the Roosevelt Commission was submitted to the Assembly of New York on January 25, 1900, and is known as Assembly Document No. 31 of 1900, and is entitled "Report of the Committee on Canals of New York." It contains much information in relation to various types of canals from official sources. After canvassing all kinds of canals in Europe and in America, that commission recommended the Barge Canal as the best type for all purposes to connect the Great Lakes with the ocean. Its recommendation met with the approval of Governor Roosevelt, and in 1903 the people of the State authorized their construction at an initial bond issue of \$101,000,000. Since that time, three other bond issues have been authorized. These aggregate altogether \$154,800,000, in addition to \$2,500,000 directly appropriated in 1920 for a State elevator at Oswego and one also in New York.

A further bond issue of thirty or more millions of dollars may be necessary to pay land and other damages and for additional elevators and other terminals than the fifty or more in the process of construction or already constructed.

This will complete the greatest system of artificial waterways in America, and one of the most approved types of canals in the world.

They are free for all to use and are maintained by the State of New York at an annual expense of upwards of many thousands of dollars.

In 1900, before the Barge Canal type was decided upon, the State Engineer and Surveyor was authorized to make a survey of the routes and an estimate of the probable cost of such canals. The State Engineer, Hon. Edward A. Bond, called to his assistance several distinguished engineers, namely, Hon. Elnathan Sweet, whose report on the problem of the resistance encountered in navigating restricted waterways did much to solve that problem; George S. Morrison, member of the Isthmian Canal Commission; Major Thomas W. Symons, of the Corps of United States Army Engineers, who had served on prior canal commissions; Professor William H. Burr, of the Isthmian Canal Commission; Major Dan C. Kingman, of the Corps of Engineers of the United States Army; Alfred Noble, member of the Isthmian Canal Commission, and also of the Board of Engineers on Deep Waterways, *supra*; David J. Howell, of Washington; George Y. Wisner, of Detroit, member of the Board of Engineers on Deep Waterways; Emil Kuichling, in charge of water supply; Trevor C. Leutzé, consulting expert, and many other distinguished engineers. These were experts of national and some of them of international repute. They also made an exhaustive investigation of various phases of a connecting waterway between the Great Lakes and the sea and reported thereon to the Legislature of New York in 1901, in favor of the Barge Canal type, to be constructed across the State of New York. They had before them the report, surveys and maps of the Board of Engineers on Deep Waterways, *supra*, but did not recommend that route to the sea. The report contained the following:

“The present report has been made with the full knowledge of the many former surveys, studies, projects and estimates which have been made during the past one hundred and twenty years for various improvements of the navigation routes between the Hudson and Lake Ontario and Lake Erie, and also of the Canadian route by way of the St. Lawrence.”

It will thus be seen that the distinguished engineers, than whom there were none more eminent in the country, did not approve

the St. Lawrence Ship Canal project, surveyed in 1900, but co-operated in designing New York's Barge Canals as the best type of waterway for the tonnage passing between the Great Lakes and the ocean.

Hon. Lewis Nixon, of New York, one of the best informed men in the country, in a recent address, said:

"The bulletin of the Bureau of Foreign and Domestic Commerce, issued in 1918, most admirably covers the question:

" 'Before recommending the construction of a new canal at a high cost, assurance must be given that the direct and indirect benefits to be derived are commensurate with the outlay required. It must also be demonstrated that the existing facilities are insufficient and cannot be made sufficient, at a cost lower than for the proposed ship canal.' "

The force of this statement will be appreciated by the peoples of both nations who have many waterway projects already approved and awaiting funds for their completion, as to whose feasibility there is no doubt. It is far better that all such projects, both in Canada and in the United States, should go forward under independent supervision and national enterprise, to satisfy the exigencies and commercial necessities of various localities than that the two nations should join in an enterprise of such doubtful utility as the proposed St. Lawrence Ship Canal project, which at the lowest estimate would cost many millions.

Canada has an interior system of waterways greatly in need of improvement. For years, the Ottawa River, and connecting waterways, have been awaiting funds for improvement. In the United States there are several thousand miles of waterways and scores of harbors awaiting appropriations to carry forward improvements that have been approved and which are necessary to relieve railway traffic conditions.

Must all such improvements be further delayed for lack of appropriations, while millions are to be expended in a joint undertaking by the two governments in the construction of a ship canal down the St. Lawrence River, a project which has been repeatedly disapproved by commissions and expert authorities in the United States?

Neither the United States nor Canada can afford to waste millions of dollars when there is such an imperative demand for the improvement of rivers and harbors in both countries, as to whose utility there can be no doubt.

The United States Board of Engineers have reported to Congress that upward of \$78,000,000 are needed now to carry forward projects partially completed and others that have been approved. Next year there will be still a larger demand for river and harbor appropriations. At the recent session of the Rivers and Harbors Congress it was stated by the representatives from the Mississippi Valley that a billion dollars would be required to carry on river and harbor improvements wholly within this country, in the next ten years. The elaborate annual reports of the Chief of Engineers will show where such appropriations are needed. There is hardly a river or port from Maine to Florida, or along the Gulf of Mexico, or along the Pacific Coast, or along the Great Lakes, or the interior of the country, but that needs Federal appropriations to complete projects that already have been approved.

Undoubtedly there are similar demands upon the exchequer of the Dominion of Canada to carry forward needed improvements in its extensive rivers and many harbors. Its central provinces are seeking an outlet to Hudson Bay and have several projects in view for the relief of that great wheat-bearing territory.

The eastern provinces also have projects in view for the improvement of their rivers and harbors for which large sums must be appropriated. For a hundred years the two nations have been in perfect accord and no thoughtful person would suggest that these cordial relations should ever be severed, but as a matter of prudence and good statesmanship, if a ship canal were ever to be built down the St. Lawrence River, and for nine-tenths of the distance from Lake Ontario to the Gulf of St. Lawrence wholly within Canadian territory and under the sovereign control of the Dominion of Canada, if not the British Empire, then there should be a cession of territory the entire length of the St. Lawrence River, five or ten miles back from the river, constituting a zone like the Panama Canal Zone, secured by treaty with the Republic of Panama (*Wilson v. Shaw*, 204 U. S. 24), or like the zone

recently established by allied powers along the Bosphorus, extending from the Black to the Ægean Sea. Such zone should be neutral territory or under the joint sovereign control of both nations.

Some such concessions ought to be made by both nations to secure the freedom of the St. Lawrence from the domination of either nation, if it were to become a highway built and maintained by both nations. That must be apparent to all, otherwise it may become a waterway for military or naval purposes of transcendent importance in dominating the sovereign control of the Great Lakes, whose neutrality is now preserved by international treaty.

No one is able "to dip into the future" far enough to foresee what international exigencies and complications may arise in another half century, to disturb existing conditions, and neither nation should be subject to such internal naval attack, as would be possible if the St. Lawrence River were made navigable for naval vessels.

Therefore, a neutral zone should be delimited and maintained along the St. Lawrence, if that is to be made a highway at the expense of the two nations for oceangoing vessels.

The International Joint Commission is authorized to inquire:

"What traffic, both incoming and outgoing, in kind and quantity, is likely to be carried upon the proposed route both at its inception and in the future? Consideration to be given not only to present conditions, but to probable changes therein resulting from the development of industrial activities due to availability of large quantities of hydraulic power?" The International Joint Commission have under consideration four different schemes or methods of improvement, as follows:

- (a) By means of locks and navigation dams in the river.
- (b) By means of locks and side canals.
- (c) By a combination of the two preceding methods.
- (d) By means of locks and power dams.

Evidence in the form of transcripts of reports of the War Department and Department of Commerce was presented at the Buffalo hearings, which evidence showed that nine-tenths of the tonnage of the Great Lakes was domestic tonnage and not one-tenth was exported. That less than ten million tons of Great

Lake tonnage reached the seaboard. That only five to six million tons of grain were exported from the entire Atlantic Coast, and that such exports were gradually decreasing as the grain areas were being exhausted and home consumption was increasing, and in the not distant future the entire wheat and cereal products of the United States would be entirely consumed in this country. Then there will be no need of a ship canal down the St. Lawrence to transport American grains to Liverpool or elsewhere. Evidence shows that much of such American products reach the seaboard through other Atlantic ports than New York and that the amount of grain exported from New York is no greater than the amount now exported from Montreal, or if the evidence does not so show, the fact is that Montreal is now exporting as much grain as New York.

The evidence also shows that the incoming and outgoing traffic is not such now or likely to be such in the future as to warrant the expenditure of one hundred to five hundred million dollars in the construction of the St. Lawrence Ship Canal, whose upkeep, operation and interest on investment would entail an annual outlay of six million dollars or more, when the prospective traffic over it is so uncertain.

For reasons already stated, we respectfully submit that the two nations are not warranted in embarking upon such a project as a commercial necessity, even though it were not fraught with many well-nigh insuperable difficulties, imposed by nature, which neither art nor industry can remove.

POINT II

POWER DEVELOPMENT

It appears, both from the phraseology of the act and orders of the War Department, authority was conferred upon the International Joint Commission to investigate and report as to schemes or methods of such improvement of the St. Lawrence River by means of locks and power dams, as well as from the appearances of distinguished representatives of the hydroelectric and other power interests, at the various hearings of the commission, and

from the propaganda widely distributed and published in advocacy of the project that it is quite as much a power development project as one in aid of navigation. That appears to be the primary purpose of the proposed improvement and the promotion of commerce is only an incident. If this be so, it will have a most important bearing upon the entire matter.

Under Section 8 of Article I of the Constitution of the United States, authority is conferred upon Congress "to regulate commerce with foreign nations and among the several states and with Indian tribes." That authority is well understood and has been frequently defined. It is contained in what is known as the commerce clause of the Constitution.

In the foregoing Constitution enactment, the States did not authorize the Federal Government to take private property, such as water and riparian rights, without due process of law, for any purpose except in aid of navigation. It cannot be seriously contended that the construction of dams across the St. Lawrence for power development purposes and, in so doing, the taking of private property and the destruction of power plants already installed and in operation, are within the authorization of the commerce clause of the Constitution already quoted. If not, then whatever property or riparian rights are taken or impaired in the prosecution of the St. Lawrence River improvement project must be paid for. What they will amount to is a matter of importance to all concerned. These are additional to the initial cost of construction of the power dams and the installation of their equipments.

If it were permissible under the Constitution to take the privately owned water-front properties along the St. Lawrence River without due process of law, what are the people of the United States to gain by constructing several dams across the St. Lawrence River at the joint or equal expense of the Canadian and Federal Government, when only one-quarter or less of the power to be developed will be available for use in the United States?

Why should the United States pay one-half the cost of such a development, variously estimated at from one hundred million to one billion and three hundred million dollars for an estimated production of one million horse power, and as we shall hereinafter

show, a much less amount of power available for use in the United States, when there are still undeveloped within the United States water powers to the extent of ten or more millions horse power? Will the return to the United States justify the expenditure and especially so if the amount available for the United States be much less than one million horse power out of the 4,130,555 horse power that may be developed along the St. Lawrence from Lake Ontario to Montreal, at the equal expense of the two nations?

These are questions that the Congress of the United States will seriously consider before committing this nation to the project.

It was stated by Alexander T. Vogelsang, Assistant Secretary of the Interior, at Washington, on December 10, 1919, that the records from 1860 to 1917 show the mean annual flow at the head of the St. Lawrence is 241,000 second-feet. That is undoubtedly somewhat greater than the continual flow available for power development purposes.

As already stated, the total fall in the river from Lake Ontario to St. Regis, at the international boundary, is 92 feet, so that the total amount of potential power that may be developed in that part of the river, according to the usual formula, not that of the Federal Power Commission, is 2,013,216 horse power.

However, on account of losses in the process of generation, only 90 per cent of such power can be converted into electrical energy. That reduces the amount available at the switchboard to 1,811,894 horse power, or 1,351,572 kilowatts. Only one-half of that power, or 905,947 horse power, or 675,786 kilowatts, will be available for use in the United States.

The amount of potential power in that part of the river between St. Regis and Montreal, computed according to the same formula, where the total fall is 129 feet, is 2,540,388 horse power, or 1,895,129 kilowatts at the switchboard.

This formula used in this computation allows 80 per cent efficiency and that is reduced to 90 per cent when converted into electric energy and available at the switchboard. From the foregoing it may be seen that the amount of potential power that could be developed along the international boundary is only

2,013,216 horse power, and only one-half of that will be available for use in the United States.

When that potential power is reduced, as it must be, on account of the losses in generation and in conversion into electric energy according to the above formula, there will be available for use in the United States less than 1,000,000 horse power.

The foregoing computation is based upon the theoretical utilization of the mean flow, rather than the minimum flow of the river, and also on the utilization of the total fall of 92 feet between Lake Ontario and St. Regis, which will be impossible, for the fall is broken up into several rapids. The flow is through restricted channels of varying slopes. All such conditions tend to reduce the amount of water power that may be produced. In its generation it is likely that much less power would be produced than the estimates herein given. If the coefficient of efficiency were 70 per cent, as estimated by some experts, instead of 80 per cent, as allowed in this computation, that would materially reduce the estimates of the production both above and below St. Regis. The fact is that the amount of power available for use in the United States cannot be 1,000,000 horse power, but will be less than 900,000 horse power.

Hon. George Clinton, who has given the matter much consideration, following the formulæ of the Federal Power Commission, estimates the power available for use in the United States as only 681,066 horse power.

Until the engineers appointed by the two countries have made the surveys and prepared the plans and estimates for the proposed improvement for such ship canal and power development, the International Joint Commission will not have the information necessary to report to the two nations its conclusions and recommendations in relation to the project. Unfortunately, for the opponents of the project, they have not the advantage of the expert information that will ultimately be presented to the Commission. But there are some phases of the matters involved in such a gigantic undertaking that must be recognized by all officials and others interested in the investigation. In a recent article published in the *New York Times*, embodying the views of Hugh L. Cooper, the expert hydraulic engineer who designed the Mississippi Power Company dam at Keokuk, Iowa, it appears that one

of the proposed great power dams stretching across the St. Lawrence will cost approximately \$300,000,000.

That is but one of the structures involved in the vast scheme, said to be three times as great an undertaking as the building of the Panama Canal. Several other dams have been proposed and will be necessary if all the potential power capable of development is to be utilized, so that the total cost of the entire development may approximate \$1,300,000,000, as stated in the *Times* article.

The construction of dams in the St. Lawrence will be exceedingly costly and difficult to maintain, as may be readily appreciated from the physical conditions to be encountered and the tumultuous, voluminous waters to be withstood.

The Assouan dam, $1\frac{1}{4}$ miles long, extending across the Nile in Egypt, and costing to date approximately \$20,000,000, is the nearest approach of any of the modern dams to the type of dams necessary to check the flow of the St. Lawrence and convert its rushing rapids into great lakes of still waters for power development purposes. Many engineering problems must be solved, full and complete plans must be prepared and detailed estimates must be made before Congress can be expected to appropriate moneys for the project.

We understand that is being done and trust that we may have the opportunity of examining them after they are presented to the commission.

The colossal sums involved in the construction of such vast public works are additional to the large amounts that must be expended for land and other damages. In the improvement of the St. Lawrence, such damages will unavoidably be large on account of the lands and water powers that must be taken and the riparian and other property rights that will necessarily be destroyed. That brings us to the consideration of some legal questions involved in the prosecution of the St. Lawrence project.

POINT III

LEGAL QUESTIONS INVOLVED

All fast lands along the shores and the islands in the waters and submerged lands under the waters of the St. Lawrence River, south of the international boundary, belong to and the title thereto is vested in the people and in the State of New York, and cannot be taken for public use for power development purposes without due process of law, that is, without compensation being made to the owners thereof. *Pollard v. Hagan*, 44 U. S. 212; *Illinois Central R. R. Co. v. Illinois*, 146 U. S. 387; *Shively v. Bowlby*, 152 U. S. 1-57.

The conditions of the St. Lawrence are entirely different from those of the St. Mary's River where all the lands and waters were declared by Congress to be needed to improve the navigation of the St. Mary's River and therefore riparian owners were compelled to submit to the exigencies of commerce, under the grant by the States to Congress of the authority to regulate commerce with foreign nations and among the several States, and with Indian tribes. *United States v. Chandler Dunbar W. Power Company*, 229 U. S. 53.

Under no circumstances can it be said that all the waters of the St. Lawrence at any point between Lake Ontario and St. Regis are necessary to improve the navigation of the river, and therefore the Federal government cannot take the lands under any waters not necessary to improve navigation and thereby promote commerce. That is the only ground upon which riparian interests can be taken, and then only by the United States, without making compensation therefor.

In the recent case of the *United State v. Cress*, 243 U. S. 316-332, Mr. Justice Pitney said that:

"The states have authority to establish for themselves such rules of property as they may deem expedient with respect to streams of water within their borders both navigable and non-navigable and the ownership of lands forming their beds and banks * * * subject, however, in the case of navigable streams to the paramount authority of Congress to control the navigation, so far as may be necessary for the regulation of commerce among

the states and with foreign nations, * * *. The exercise of this authority being subject, in its turn, to the inhibition of the 5th Amendment against the taking of private property for public use without just compensation." He cited many authorities in support of the decision of the Supreme Court in that case. There were two actions decided as one to recover damages for the taking of lands and water rights by means of backing water, resulting from the construction and maintenance by the government of certain locks and dams upon the Cumberland and Kentucky rivers in aid of navigation, and judgments for damages in favor of plaintiffs were affirmed.

Subject only to the paramount jurisdiction of the United States under the commerce clause of the Federal Constitution, that being subdivision 3 of section 8 of article I thereof, the jurisdiction of the State extends over the same and the title to all the lands, riparian and water rights in the St. Lawrence River, along the south side of the international boundary, is in the people and in the State of New York. Riparian rights are the property of the owners of the uplands. None of those can be taken away by the United States under the 5th Amendment to the United States Constitution without due process of law, that is, without just compensation.

The jurisdiction of the State of New York over the shores and submerged lands and water rights along the south shore of the St. Lawrence River was upheld in *Matter of Long Sault Development Company*, 212 N. Y. 1, and was recognized in *Long Sault Development Company v. Call*, 242 U. S. 272.

All the islands, shore lands, water powers and riparian rights along the St. Lawrence south of the international boundary are vested property rights and have been so since the Revolution. The owners of all these rights cannot be divested of them for public use by the government of the United States under the 5th Amendment to the Constitution without just compensation. *United States v. Cress*, 243 U. S. 316; *Martin v. Waddell*, 41 U. S. 367; *Yates v. Milwaukee*, 77 U. S. 497; *Hardin v. Jordan*, 140 U. S. 371; *Dulton v. Strong*, 66 U. S. 23; *The Genesee Chief v. Fitzhugh*, 53 U. S. 442.

Riparian rights have been recognized as valuable property rights from the time of the Magna Charta. They include the rights of fishing, boating, wharfing, access to navigable waters, and the use of the waters flowing by the lands fronting on a stream, river, lake or the sea. At common law as declared in some States at the time of the Revolution and still in New York, riparian proprietors have all the rights to submerged lands, such as the rights to use the waters for fishing, boating, access out to the navigable waters, including the right to build wharves and the use of the flowing water along their water-fronts, but the bare naked title is assumed to be in the State. These rights, however, are subject to the paramount right of the United States to improve such watercourses for the promotion of commerce and, if need be, to use the submerged lands for that purpose only and the State in its governmental capacity is charged with the trust obligation to preserve the use of such waters in a condition for navigation for the people of the State. The State cannot absolve itself from that trust obligation, nor can it grant it to others. *Town of Brookhaven v. Smith*, 188 N. Y. 74. *Matter of Long Sault Development Company*, 212 N. Y. 1. That case was dismissed on appeal to the Supreme Court of the United States but with an opinion 242 U. S. 272.

Originally riparian rights belonged to the lord of the manor and even the king could not interfere with such rights. It was held in *Attorney-General v. Parmeter*, 10 Price 378, and affirmed in 10 Price 412, under the title *Parmeter v. Gibbs*, that a grant by Charles I of a waterfront along the sea was void because in conflict with prior riparian rights and also as interfering with the public rights of navigation. It was not finally decided in England until 1844 in the case of *Attorney-General v. London*, 8 Beaver 279; 18 L. J. Ch. N. S. 314, that the title to the submerged lands under navigable waters was in the Crown. However, a different opinion had quite generally prevailed in this country owing presumably to the influence in judicial circles of "De Jure Maris" of Lord Hale often quoted by the judges, as in *Shively v. Bowlby*, 152 U. S. 13, where it is said that: "In England, from the time of Lord Hale, it has been treated as

settled that the title in the soil of the sea, or arms of the sea, below highwater mark, is in the King, except as far as an individual or a corporation has acquired rights in it by express grant or by prescription, or usage and this title, *jus privatum*, whether in the King, or in a subject, is held subject to the right, *jus publicum*, of navigation and fishing." *Gun v. Free Fishers of Whitsable*, 11 H. L. Cases 192. See *Buccleuch v. Metropolitan Board of Works*, L. R. 5 H. L. Cases 418; *Lyon v. Fishmongers Co.*, L. R. 1 App. Cases 662; *North Shore R. Co. v. Pion*, L. R. 14 App. Cases 612. "The public common of piscary belongs to the people of England and cannot be granted away by the king." *Martin v. Waddell*, 41 U. S. 412.

Justice Gray, in *Shively v. Bowlby*, 152 U. S. 15, said: "Upon the American Revolution all the rights of the Crown and of Parliament vested in the several states, subject to the rights surrendered to the national government by the constitution of the United States."

Riparian proprietors of lands bordering upon navigable streams have surrendered nothing to the Federal government other than the right to improve the waters in front of their lands in aid of navigation under the commerce clause of the constitution for "commerce includes navigation" (*Gilman v. Philadelphia*, 3 Wallace 713, 724), but such proprietors did not surrender their property rights, which are as sacred as any other property rights (*Bowman v. Wathen*, 2 McLean, p. 376), in aid of hydro-electric or other industrial development. Neither has the State of New York surrendered, nor can it surrender, its rights in the submerged lands under the waters of the St. Lawrence River which it holds in trust for all the people of the State. *Matter of Long Sault Development Co.*, 212 N. Y. 1; *Long Sault Development Co. v. Call*, 242 U. S. 278-279; *Illinois Central R. R. Co. v. Illinois*, 146 U. S. 387.

The United States cannot take any of such submerged lands under the waters of the St. Lawrence which are owned by the State of New York, nor any of the riparian or water rights of the upland proprietors except for the express purpose of improving the navigation of that river without making compensation to the owners thereof.

Who shall estimate the extent of submerged lands and also the extent of the riparian and other rights that may be taken, or injured in the prosecution of the project under consideration for which compensation must be made? Who shall estimate the vast areas of low lying uplands that may be flooded for which compensation must be made as was decided in a somewhat similar case of flooding in *United States v. Cress*, 243 U. S. 316?

Will the Canadian government obligate itself to pay one-half of all the damages recoverable for all such losses to property owners on the south of the international boundary?

These appear to be relevant questions and will undoubtedly be given serious consideration by the International Joint Commission. The Congress of the United States will welcome information on these matters.

There is still another grave question that must be answered before Congress can appropriate public funds to carry forward the project and that is this: What authority has Congress under the Constitution of the United States, in time of peace, when its integrity is not menaced, to appropriate moneys from the treasury to construct dams across the St. Lawrence above or below the international boundary and to install the same with hydro-electric equipment for the generation of power, only a small part of which will be available in the United States? What authority is there for such an appropriation either as a national undertaking or jointly or in co-operation with the Dominion of Canada? What function of government will be promoted thereby? Even though it be conceded that the manufacture, supply and sale of power produced by water as a motive force be a public purpose, for which the several States may appropriate moneys (*Mt. Vernon-Woodberry Cotton Duck Co. v. Alabama Interstate Power Co.*, 240 U. S. 30), what authority is there for the Federal government to engage in the production and sale of power for industrial purposes? Unless there be some constitutional authority for Congress to act and to maintain eminent domain proceedings, title to the submerged lands in the St. Lawrence River within the boundaries of the State of New York cannot be acquired for such power purposes, because they are included within the State Forest Preserve, and under the Constitution of

the State the lands within the State Forest Preserve cannot be sold, or otherwise alienated, even though the Legislature were disposed to grant the same. Therefore they can only be acquired by condemnation. Section 7 of Article VII of the Constitution of New York. *People v. Fisher*, 190 N. Y. 468.

Justice Brewer said in *Monongahela Navigation Company v. The United States* (148 U. S. 336) that "the power to regulate commerce is subject to all the limitations imposed by such instrument (Constitution of the United States), and among them is that of the 5th Amendment. Congress has supreme control over the regulation of commerce, but if in the exercise of that supreme control it deems it necessary to take private property, then it must proceed subject to the limitations imposed by the 5th Amendment and take only on payment of just compensation."

Neither the act, regulating the construction of dams across navigable waters, nor the Federal Water Power Law recently enacted, authorizes the United States to take private property for public use without making just compensation therefor. There is no power in Congress to enact any legislation that will deprive the State of New York of the submerged lands and water powers along the St. Lawrence River, or that will deprive the owners of the lands fronting on said waters of their riparian and other property rights without providing for making compensation to the State and to such owners for their properties. Compensation must be made for all such tangible and intangible properties and rights as may be interfered with, impaired or taken in the prosecution of the St. Lawrence River Development project. *Monongahela Navigation Co. v. U. S.*, 148 U. S. 335-345; *Richards v. Washington Terminal Co.*, 233 U. S. 552; *United States v. Cress*, 243 U. S. 316.

The State of New York was the first State in the Union to undertake the construction of a comprehensive system of waterways within its confines. For a century it has investigated, planned, constructed, three times enlarged, reconstructed and operated that system at its own expense, aggregating in the last improvement to date \$154,800,000 for construction alone with thirty millions of dollars still to be raised, making a total expenditure, when completed, since 1903, of upwards of \$180,000,000.

In addition to that, prior to 1903, it expended upon its canal system seventy-five or more million dollars.

Its canals are of the most approved type and are free of tolls. They are maintained entirely by State taxation.

The State of New York made an exhaustive investigation of the whole subject between the Great Lakes and tidewater before deciding upon the Barge Canal type.

The Roosevelt and other commissions investigated at great length and reported on the kind of canal best adapted for such service. The people of New York showed their confidence in the Barge Canal System in approving at general elections the four canal referendum measures that have been submitted to popular vote. Down to the present time the system has not had a fair trial. The World War and Federal operation have greatly hampered its use and retarded the formation of operating companies. Such companies are now being formed and the outlook is more promising now than at any time since the Barge Canals were completed. The tonnage over the system in 1920 was 1,421,434 tons, a substantial increase over that of 1919.

The people of New York strongly object to being taxed for the construction of a ship canal down the St. Lawrence River. They believe such a canal will be a commercial failure, and will cost millions of dollars, a substantial part of which cost will fall upon the people of that State.

It cannot relieve railroad congestion in the west any more than it can be relieved by the vessels of the Great Lakes, which were not permitted for some time after the World War by the Railroad Administration to carry the grains of the west. All familiar with the conditions know the causes of the congestion. It is not due to the water carriers of the Great Lakes, nor to the inefficiency of the New York canals. If the canal tonnage has not been as large as was expected, it is due to causes outside of New York and beyond its control. Its system can transport more grain and other products than have come, or ever will come from the Great Lakes region for export.

There are many calls for appropriations for the improvement of the rivers and harbors within the confines of the United States that have been approved by the Board of United States Engineers.

Large appropriations are needed for all such improvements. Such appropriations ought not to be postponed in order to provide funds for such a project as the St. Lawrence Ship Canal and power development project.

The State of New York, through its Commission on the St. Lawrence Ship Canal Project, respectfully submits the foregoing points, in addition to matters heretofore submitted to the Honorable International Joint Commission on Boundary Waters, for its consideration in relation to the St. Lawrence Ship Canal and power development.

As stated in the opening paragraph of this report, such report is preliminary only and will be followed later by final report, setting forth in detail the acts and proceedings of the commission and its recommendations. The object and purpose of this preliminary report is that such preliminary report become a Senate document and that sufficient copies thereof be printed so that wide publicity may be given to the specific grounds upon which the commission opposes the so-called St. Lawrence Ship Canal Project.

Dated at Albany, N. Y., January 5th, 1921.

Respectfully submitted,

LEONARD W. H. GIBBS,
Chairman.

EDWARD S. WALSH,
Vice-Chairman.

HENRY W. HILL,
Acting Secretary.

JAMES J. WALKER,
MURRAY HULBERT,
FRANK M. WILLIAMS,
SIMON L. ADLER,
CHARLES D. DONOHUE,
Commissioners.

STATE OF NEW YORK

**PROGRESS REPORT
NUMBER 1**

OF THE

**Commission in Opposition to the
St. Lawrence Ship Canal
and Power Project**



**ALBANY
J. B. LYON COMPANY, PRINTERS
1922**

PROGRESS REPORT NO. 1
OF THE
COMMISSION CREATED PURSUANT TO CHAPTER 806
OF THE LAWS OF 1920

To the Legislature of the State of New York:

The Commission created pursuant to Chapter 806 of the Laws of 1920 to represent the State of New York at hearings before the International Joint Commission on Boundary Waters created under and by virtue of Article 9 of the Convention concluded on January 11, 1909, between the United States and the Dominion of Canada submits this progress report number one embodying in part its answer under date of April 21, 1921, to such of the statements and such of the arguments of the proponents of the St. Lawrence Ship Canal and Power Project as were presented by such proponents to the International Joint Commission on Boundary Waters at the Detroit hearing on March 30, 1921. Such answer was filed with the American branch of such Commission at Washington on April 22, 1921, and with the Canadian branch of such Commission at Ottawa, Canada, on April 28, 1921.

ANSWER TO SOME STATEMENTS AND ARGUMENTS OF PROPO-
NENTS OF THE ST. LAWRENCE SHIP CANAL AND POWER
PROJECT SLIGHTLY REVISED, HOWEVER, FOR PRESENTATION
TO THE LEGISLATURE.

To the International Joint Commission on Boundary Waters:

INTRODUCTION

GENTLEMEN.— In conformity to the order of your Honorable Commission made at the city of Detroit on March 30, 1921, permitting the New York Commission to file an answer to the statements made at the hearing there of your Commission, upon receiving a transcript of the records of such hearing we submit the following reply. The time, however, has been so short that it has been impossible for us to obtain all material available in the different sections of the country in answer to the arguments of the proponents at Detroit, and to classify and present the same in the manner which the matter under consideration deserves.

We have already presented such material from official sources relating to the commerce of the Great Lakes and the export tonnage from the Atlantic seaboard, which was somewhat larger

during the war period than such export tonnage is under peaceful conditions. The transcripts of official records as to such lake and foreign tonnage have been offered in evidence and undoubtedly will receive your careful consideration.

RECORDS IN EVIDENCE

The records so introduced are official and not speculative and, therefore, should be studied with care to arrive at a sound conclusion as to the probable amount of export tonnage from the United States and Canada in the future. The records are fairly complete for the last half century and they tend to show that the export of grains is not likely to increase as consumption in North America increases and productiveness of the grain areas decreases, as is the case within the United States. This does not apply, however, for the present to the western provinces of Canada, which are being opened up to grain production, but those provinces may have an outlet to the sea via Hudson Bay as proposed by the producers of those Provinces.

GRAIN PRODUCTION DECREASING AND HOME CONSUMPTION INCREASING

The attention of the Commission is called to the records in evidence showing the grain production of the United States and the amount exported therefrom prior to and during the war period. From those records it appears that the importation of grains from the Dominion of Canada is approximately one-quarter of the entire production of the United States. A large part of such Canadian grains, however, may pass through the United States for export but evidence submitted before your Honorable Commission shows conclusively that consumption within the United States of its cereals is rapidly approaching the production of such cereals and in the near future there will be no grains for export from this country, but its entire product will be consumed within the United States. That undoubtedly will be the condition before a St. Lawrence Ship Canal could be completed; therefore so far as the United States are concerned the great wheat growing areas of the West will find their product consumed entirely within the United States and they will not need a ship canal down the St. Lawrence to market their grains.

Mr. Herbert Hoover virtually admitted, and, as we recall it, stated that unless the United States went into intensive farming

its entire cereal products would be consumed ten years hence by the people of the United States, provided the increase in population continued at its present rate.

That is a very important matter for the consideration of your Honorable Commission in determining the practicability and necessity for such a project as the St. Lawrence Ship Canal.

PROJECT NOT FEASIBLE

Unless the export tonnage from the Great Lakes region be much greater in the future than it has been in the past, the project would not be commercially feasible, to say nothing about the insuperable difficulties interposed by nature, which neither art nor industry can remove to the operation of such a waterway through the long tortuous channels from the Gulf of St. Lawrence to the Great Lakes' ports; in other words, the export tonnage would not warrant such a project even though it were feasible from a navigation point of view.

ENTHUSIASM FOR PROJECT WILL SUBSIDE WHEN ITS IMPRACTICABILITY IS FULLY UNDERSTOOD

The Honorable Commission will recall the fact that at most of the hearings west of Buffalo the advocates of the project were swept along by a wave of enthusiasm, that is likely to subside when the real facts are fully understood and the impracticability of the project clearly appears. This was quite apparent at the Detroit meeting and from what was said on that occasion. Mr. A. painted a glowing picture of Detroit, which he stated, at page 7524 of the record, "was about the center of the United States." We are not quite sure that Chicago or St. Louis would agree with him in that statement, which shows the extent to which enthusiasm may sweep one along in the advocacy of a project howsoever visionary.

THE UNITED STATES MAY MORE WISELY IMPROVE ITS INTERIOR WATERWAYS IN NEED OF IMPROVEMENT

It is quite possible, if the United States were to furnish cheap transportation by water to its score or more of interior cities — as it might do if it were to improve its interior waterways, recommended by the Board of Engineers, United States Army — that some of them would become great centers of industry and many of their abandoned factories might be rehabilitated and the wheels

of industry set in motion. At least that is not an uncommon method of presenting arguments in advocacy of river and harbor appropriations. A survey of the rivers and harbors bills that have been enacted by the Congress of the United States for the last decade and the hearings before the Committee of the House of Representatives on Rivers and Harbors, will reveal glowing pictures of many cities of great promise only awaiting the outpouring of millions from the United States Treasury to give them the breath of life, whereupon, it was predicted, they would become great commercial and industrial centers.

SPECULATIVE ARGUMENTS FOR THE ST. LAWRENCE

Many arguments have been advanced for the St. Lawrence Ship Canal predicted upon speculative statements as misleading as the dissolving "aery shapes" that

"Fancy with her dream-dipped brush"

may project when the cold, calculating reasoning powers are dormant. It was William Warburton, a celebrated English prelate, who said, that "enthusiasm is that state of mind, in which the imagination has got the better of the judgment."

ILLUSTRATION FROM THE ARGUMENT IN THE CASE OF THE "NEREIDE"

From the great mass of statements made by people of high repute and of the best motives, it must be apparent to the members of the International Joint Commission on Boundary Waters that such proponents of the project are in much the same position as was William Pinkney in his advocacy of the case of the "Nereide" before Chief Justice Marshall.

Chief Justice Marshall, in speaking of the incongruous mixture of discordant attributes of the Nereide (9 Cranch. 406, 430) exhibiting a *disiordia rerum*, glowingly pictured by William Pinkney, "whose opinions," it was said, "had acquired almost the authority of judicial decisions," said, "with a pencil dipped in the most vivid colors and guided by the hand of a master, a splendid portrait has been drawn exhibiting the vessel and her freighter as forming a single figure, composed of the most discordant materials of peace and war.

"So exquisite was the skill of the artist, so dazzling the garb in which the figure was presented, that it required the exercise of that cold investigating faculty, which ought always to belong

to those who sit on this bench to discover its only imperfection, its want of resemblance."

In the determination of the matters submitted to the Commission for its decision, it must apply tests similar to those applied by Chief Justice Marshall, Lord Chancellor, John Somers and other great jurists in the disposition of great fundamental questions before them. It will not do to be wafted away on the wings of fancy *in nubibus*, as many of the proponents of the project appear to have been without any check or opposing voices raised against them.

FACTS NOT FULLY UNDERSTOOD BY WESTERN ADVOCATES

Such advocates as Governor H. of Iowa, Mr. H., representing the Governor of Minnesota, Mr. S., representing the Governor of Wisconsin and others representing some other distinguished officials of the Central Western States, unopposed and laboring under a misconception of the real facts incidental to the construction and operation of such a waterway as that under consideration, have unwittingly endorsed the project.

It appears from the record of the hearings of the Honorable Commission through the Central Western States that the great masses of people did not attend the hearings and had not the opportunity of studying the questions involved sufficiently to express any opinion thereon. At the best, laymen can throw but little light on a subject of such magnitude and complexity.

SENTIMENT FOR THE PROJECT MANUFACTURED

The advocates, however, of the project appeared repeatedly at the several hearings and we think it is a fair inference from their activity that they had worked up such sentiment as they were able to arouse in the various localities in favor of the project; in other words, the proponents had an organization equipped to awaken sentiment theretofore dormant in favor of the project, whereas the great mass of taxpayers had little or nothing to say. That is the usual course pursued in this country by advocates of any measure howsoever impractical.

AMERICAN WATERWAYS SHOULD BE IMPROVED

It will not escape the attention of the Honorable Commission that communities all over the United States have heretofore expressed their judgment on various waterways projects through their Congressional Representatives and they have been able to

impress the Congress of the United States with the importance of having surveys made and projects recommended and appropriations to some extent made for the improvement of approximately 5,000 miles of waterways within the United States. The various rivers and harbors appropriation bills carry from \$12,000,000 to \$40,000,000 within the past four or five years show the extent of the various projects recommended by the engineers of the United States Army and approved by the Congress of the United States in making appropriations to carry on the work of such projects.

Are all such projects to be stopped, the work suspended thereon and indefinitely delayed in order to make a colossal appropriation for the gigantic project which will cost, according to the estimates of Col. Hugh L. Cooper, who built the Keokuk Dam across the Mississippi River, not less than one billion, one hundred million dollars, because the United States Government has not funds sufficient to carry on its interior waterway and harbor improvements and also the St. Lawrence Ship Canal Project at the same time? Does the Honorable Commission suppose for a moment that the Congress of the United States will assent to any such neglect of its waterway projects to embark upon the St. Lawrence project, fraught as it is with many obstacles both in construction and in operation and of doubtful commercial utility?

MASTERS OF OCEAN AND GREAT LAKES VESSELS DO NOT ADVOCATE THE ST. LAWRENCE PROJECT

Has it not occurred to the Commission that no recognized navigators or masters of ocean-going vessels have advocated the project under consideration, which is endorsed by many organizations in the interior of the country and a thousand miles or more from the waterway? Such endorsement can only be accounted for upon the theory that such communities are wholly unfamiliar with the subject and are seeking this as the one panacea for all their transportation difficulties. Any other suggestion made would be as likely to receive their support. At every session of the Rivers and Harbors Congress in Washington there are scores of delegates from the great Mississippi territory and its tributaries in advocacy of large appropriations running up into the millions of dollars and those appropriations are based upon engineering and other investigations that commend them to the sober judgment of Congress, and Congress is making from year to year appropriations for such projects.

THE MISSISSIPPI SYSTEM

The great Mississippi system with its many navigable tributaries furnished a complete outlet to the sea for the products of many states for ten or twelve months of the year, whereas the proposed St. Lawrence project would furnish an outlet for only a small amount of tonnage for six or seven months of the year at the most but the insurance rates are so high that the freight rate will be out of all proportion to the Mississippi or the New York water route for freight originating in the Mississippi Valley or the upper lake ports and destined for foreign ports.

PHYSICAL OBSTACLES TO THE PROJECT

The Honorable Commission will recall the testimony introduced at Buffalo and elsewhere in relation to the physical features of the St. Lawrence route, the obstacles to be overcome and the dangers to navigation of vessels passing through the Gulf and up the St. Lawrence and through rivers and lakes to the head of the Great Lakes at an elevation 600 feet above the level of the sea, a distance of 2,250 miles through ice flown, befogged and tortuous channels and up through twelve or more ship locks necessitating delays at each of them. The freight rates on tonnage passing up or down that route cannot be definitely stated, but in all probability such rates would exceed the rail and ocean rate combined, on tonnage from the head of the Great Lakes to European ports. If there be added to such all-water route rates the rail rate from the point of origin such as Omaha, to the lake port of shipment, such as Duluth, then those two rates would certainly exceed the all-rail rate to Atlantic ports plus the ocean rate to Liverpool on grains originating in the Omaha territory.

EXHIBITS AS TO MOVEMENT OF GRAINS DOWN THE LAKES AND TO LIVERPOOL VIA NEW YORK

In this connection, we will submit a statement, marked Exhibit No. 1, from the Canal Traffic Agent of the Department of Public Works of the State of New York, bearing directly upon the question of the transit of grain from the Great Lakes' ports to Europe, covering the 25-year period from 1890 to 1915, and also a transcript marked Exhibit No. 2, taken from the Annual Statistical Report of the New York Produce Exchange, for the year 1916, showing lake and canal and lake and rail and ocean freight rates on wheat for the years 1900 to 1914, inclusive.

It is possible that the proponents of the project in predicting the freight rate may not have taken into consideration the twelve items making up such a freight rate as appears in the statement of J. W. Grady, general traffic agent of the State of New York, shown in Exhibit No. 1. No estimate which fails to take into consideration all the items entering into the gross rate is of any value in aiding the Commission in arriving at a correct conclusion in the matter.

OCEAN CARRIERS

It must be borne in mind that an ocean carrier cannot load to its full ocean-carrying capacity in travelling the restricted channels of the Great Lakes and their connecting waters as is clearly brought out in a statement marked Exhibit No. 3 of Frank E. Williamson, Traffic Commissioner of the Buffalo Chamber of Commerce. From that statement it appears that ocean carriers can be loaded only from 65 to 70 per cent of their carrying capacity upon the Great Lakes and for that and other reasons the Shipping Board did not approve of the use on the Great Lakes of its many idle vessels at various Atlantic, Gulf and Pacific ports.

It was clearly brought out at several of the hearings that the vessel constructed for ocean service absorbs a much larger percentage of its displacement than does the vessel constructed for Great Lakes service. Thereby the carrying capacity of ocean-going vessels is much less than the carrying capacity of lake vessels in proportion to their displacement and the cost of construction of ocean-going vessels is approximately 250 per cent, or $2\frac{1}{2}$ times greater than the cost of the construction of lake vessels of similar displacement. This increased cost of construction, together with the additional complement of men to navigate ocean vessels over the number required to operate the lake vessels and the reduced cargoes that the ocean vessels can carry in navigating the Great Lakes together with a higher rate of insurance in navigating the St. Lawrence over the navigation of the ocean from New York to Liverpool are important factors to be considered in determining the problem of freight rates and the feasibility of the St. Lawrence Ship Canal Project.

RAILROAD CONGESTION

It appears from the record of the Detroit hearing that the proponents of the project predicate their judgments on the possible relief to the congestion of railroad traffic. It is difficult to understand how that condition is to be relieved by a waterway closed

six months in the year and at a time when there is the greatest congestion of grains in the West, around and more or less remote from the Great Lakes, such small parts of which as are intended for export may be routed via the Gulf or Atlantic ports as was done during the war period. Railroad congestion will only be relieved by the improvement of such waterways as are within the confines of the United States and in touch with the tonnage to be moved. The grains of Kansas will not move via the St. Lawrence route, nor will the products of any of the states in touch with the Ohio, Missouri or other navigable tributaries of the Mississippi.

TRANSPORTATION FACILITIES

In answer to the statements that the grains of the West cannot be moved to the seaboard on account of lack of rail and water transportation facilities, the attention of the Commission is called to the fact that there are lake vessels at both Port Arthur and Fort William for the express purpose of bringing grains down the Great Lakes and owners of such grains aggregating 42,000,000 bushels at those two ports refuse to ship by boat, although such grains could be moved on the Great Lakes and through the canals of New York to the seaboard at a lower rate than they could possibly be moved in any other way. The fact is that the transportation facilities of the Great Lakes are adequate now and have at all times been adequate except during the war period, to move all the grains there were in the territory tributary to the Great Lakes, at the lowest possible freight rate, but for some reason the owners of such grains are holding them in storage, presumably for higher prices than they are able to obtain at the present time, although such Canadian wheat was selling at approximately \$1.56 per bushel in American money at the port of Buffalo and \$1.75 in Canadian money, and dealers in Buffalo stated they would pay \$1.50 in American money for all the grain in storage at those two Canadian ports.

GRAINS HELD IN STORAGE WITH VESSELS SEEKING CARGOES

This is in answer to the statement of the agricultural interests that grain was being held in storage because there were no transportation facilities, when as a matter of fact vessels were lying idle at the docks of the upper lake ports, awaiting cargoes of grain which are withheld by the owners of such grains in their demands for prices higher than those named herein. A vessel with a cargo of upwards of 300,000 bushels of Canadian wheat

arrived in Buffalo on April 14th or 15th, 1921, showing that there was ample facilities for the transportation of grains if the owners had desired to ship the same. There is a large number of vessels on the Great Lakes ready to bring down such cargoes of grain, if the owners will consent to its shipment. This is in answer to the statement that the farmers of the West have been unable to move their crops to the sea because of congested railroad conditions. We doubt much as to whether there ever has been a time during the season of navigation when the grains could not move down the Great Lakes, if the owners of such grains had so desired; in other words, the transportation facilities of the Great Lakes have always been adequate to move all the tonnage of the territory tributary to the Great Lakes.

THE NEW YORK SYSTEM AND EXHIBITS

The New York Canal System is now being equipped with fleets of barges adequate to handle all the grain coming down the Great Lakes for export, as is shown in the statement of the Canal Traffic Agent, Exhibit No. 1, and in the statement of the Superintendent of Public Works, which is submitted herewith as Exhibit No. 4. This last exhibit also shows the dimensions of the prisms of the New York Barge Canals, the dimensions of the lock chambers, the height of bridges, the size of boats and other features of the New York Canal System.

There is also submitted herewith a pamphlet, Exhibit No. 5, showing in detail the various features of the New York Canal System and maps showing the location of buoys and lights along the canal system. The State Canals are in operation 24 hours of the day. (Such exhibit, however, is not annexed hereto, but may be obtained from the State Superintendent of Public Works.)

These are submitted in answer to the statement made by H. C. Barlow, Traffic Director of the Chicago Association of Commerce, pages 7858, etc., in effect that the Erie Canal has only eight feet of water, whereas it has twelve feet with an available draft of ten feet; and in answer to his statement that the Erie Canal System is not lighted and cannot be navigated at night, which statement is found on the bottom of page 7858 and the top of page 7859. These are also in answer to his statement that there are no transportation facilities on the Canal other than those owned by the United States Government, which is not true and never has been true. There were transported over the canal sys-

tem of the State of New York during the year 1920, 1,412,434 tons, of which 891,221 tons were over the Erie Canal, which is an increase of 15 per cent over the tonnage for the year 1919. We submit herewith General Circular No. 6 of the Department of Public Works, State of New York, showing the new transportation companies formed to operate on the Barge Canal System of New York commencing with the year 1921, marked Exhibit No. 6. (That exhibit is not annexed hereto, but may be obtained from the Superintendent of Public Works.)

SELF-PROPELLED BARGES OPERATING BETWEEN DULUTH AND NEW YORK

The Honorable Commission will not fail to notice that one of the companies is the McDougall-Duluth Shipbuilding Company, with self-propelled barges of 1,500 tons capacity, said to be controlled by Julius H. Barnes of Duluth, who appeared before your Commission on one or two occasions in advocacy of the St. Lawrence Ship Canal Project. No better answer could be made to his statement before your Honorable Commission than the fact that he is now about to establish a regular service over the Barge Canal System of New York between New York and Buffalo, and to operate a fleet of vessels of 1,500 tons capacity, which is equivalent to 56,000 bushels.

LOW RATES ON ALL-WATER NEW YORK ROUTE

From the statement obtained from official sources in Exhibit No. 1, it will be seen that the rate from Duluth to Liverpool during the five-year period from 1910 to 1915 averaged only 10.73 cents per bushel and that was over the old Erie Canal because the new Barge Canal was not completed until 1918. The rate over the new Barge Canal will be much lower than was the rate over the old Erie Canal, whose boats carried only 8,000 bushels, whereas over the new Barge Canal the barges will carry from 33,000 to 66,000 bushels, depending upon their length, which will reduce the carrying charges from 50 per cent to 75 per cent and that will very materially reduce the rate via lake, canal and ocean from Duluth to Liverpool possibly below the rate for the five-year period from 1910 to 1915. That will be so low that the St. Lawrence route could not possibly be five to seven cents per bushel below it, as was stated by Mr. Barnes and quoted by Mr. Barlow at page 7863 of the record. It must be borne in mind

that the charges for handling commodities and tonnage of all kinds from 1915 to 1920 were abnormal owing to war prices and conditions.

Many of the statements of Mr. B. and other speakers before your Honorable Commission will be found to be as misleading as those which have already been examined. Others were based upon hypothetical conditions which never will or can exist. They are purely theoretical and will never be materialized. Mr. B.'s statements are faulty in so many respects that they cannot receive serious consideration under the well known maxim, *falsus in uno falsus in omnibus*.

MISLEADING STATEMENTS

It is quite possible that other portions of the record before your Honorable Commission may be equally faulty as were the misleading statements made at Detroit. Statements of the proponents of the project may not have been made misleading intentionally, but were made from want of information on the subjects discussed. Imperfect knowledge on the part of the speakers, on many of the subjects considered, undoubtedly led to many misstatements, which your Honorable Commission will discover in perusing the record. We are unable to call your attention to these, as we have not had an opportunity of perusing the record, but assume that to be the case from the statements made at Detroit and from what appeared from time to time in the propaganda sent out by the advocates of the proposition and from press reports of hearings before the Commission.

NEW YORK CANALS FREE OF TOLLS

In this connection, it may be well to again state that the New York Barge Canal System is entirely free of tolls and is an open highway to the sea. New York derives no revenue whatever from the system, but in fact expends nearly \$2,000,000 a year to maintain and operate it. This large annual expense is in addition to interest on the bonded indebtedness of \$165,000,000 created to date for the construction of the system, including terminals. It is difficult to understand why the advocates of the St. Lawrence Ship Canal project repeatedly asserted before your Honorable Commission that New York and its political divisions were deriving revenue from the traffic over its canal system, and for that reason it was opposing the St. Lawrence Ship Canal project. The bold statements made before your Honorable Commission that New York was bottling up and choking the great

West to force its agricultural and industrial interests to pay tribute to New York are absolutely unfounded and unworthy of any consideration whatever. Such statements are the outgrowth of ignorance or prejudice which ought to condemn whatever arguments were made by the speakers responsible for such statements. No other State has contributed to the commercial and industrial growth of the Central Western States bordering on the Great Lakes anything at all proportionate to New York's contribution to their growth and since 1882 it has never received a penny for the expenditures it has made to develop the State bordering on the Great Lakes. It comes with very poor grace on the part of recipients of New York's great contributions for the promotion of commerce in the Great Lakes regions for them now to assert that New York is opposing the St. Lawrence Ship Canal project from selfish motives. New England and other sections of the United States and of the Dominion of Canada are also strenuously opposing the project. What contributions have any of the Central Western States ever made for the development of Great Lakes commerce other than their share in the expenses of the Federal Government for the improvement of rivers and harbors? It will be time enough for those states to attack New York when they have contributed moneys rather than words to the promotion of the commerce in the Great Lakes region.

ORGANIZATIONS TO PROMOTE THE ST. LAWRENCE PROJECT

It must be apparent to the Honorable Commission that the laws and resolutions of different states, introduced in evidence at the Detroit hearing, showing the organizations of commissions to promote the St. Lawrence project, fail utterly to set forth any valid reasons for this nation embarking upon a project of such stupendous proportions, as that under consideration, with so little economic advantage to the nation. It would be utterly impossible for the farmers of the West to derive any such benefits from the St. Lawrence Ship Canal, as stated in their various communications to this Honorable Commission.

NO ECONOMY IN THE ST. LAWRENCE SCHEME IF IT WERE COMPLETED

In the first place, there will be no such reduction in the freight rates below the freight rates in the five-year period from 1910 to 1915 as assumed by the various proponents of the St. Lawrence project and there will be no such saving to the producer as stated

by the various speakers. If the Commission were so disposed and would investigate the elevator charges at Duluth and Chicago, it might find that they are approximately twice as great as the elevating charges at Buffalo and New York. It might also find that there are many other charges and if the Western farmer is suffering from such elevating charges at Duluth and Chicago, why has he not attempted to regulate such charges by statute, as has been done in New York, where the rate is only one cent per bushel for elevation and five days' storage? Would it not be well for the farmers and Grain Dealers' Association of Ohio, Minnesota, Wisconsin and Illinois to regulate their own terminal charges on Great Lakes commerce before charging the State of New York with extortion, which has regulated such terminal charges? We cannot believe that the Western farmer is suffering to any appreciable extent by elevating charges in New York and Buffalo not exceeding one cent per bushel on his grain when he was receiving from \$1.50 to \$2.20 a bushel for such grain. Even though ocean-going vessels were to reach such up-lake ports as Duluth, Superior and Chicago, the terminal charges at those ports would not be abrogated, for vessels would still require elevator and other transfer services.

INDIVIDUAL INTERESTS NOT SUFFICIENT GROUND FOR CONGRESS OR PARLIAMENT TO APPROPRIATE PUBLIC FUNDS

We do not imagine that the Congress of the United States, or the Parliament of the Dominion of Canada will give much consideration to the statements of the Ford Motor interests centered in Detroit when they consider the fact that that company has many branch assembling plants and factories in various parts of America and in Europe, where raw materials may be assembled from which machines or parts of machines may be distributed. Of all companies, the Ford Company is the best prepared to build and operate its factories where raw materials are most easily obtained, and its representative admitted that they were sending machines and parts of machines to various distributing points in America and Europe and there is no valid reason why the United States should embark upon an enterprise of such magnitude as that proposed to enable the Ford Motor Company to continue its output of machines from its Detroit factories. The special plea of Mr. C., Traffic Manager of the Ford Motor Company, answers itself when it says that it has assembling plants in various parts

of Europe and its exports to five or six of such assembling plants amount to \$30,000,000 a year. The country will not suffer if the Ford Motor Company makes use of the means of transportation now available when it is sending hundreds of its cars on boats now navigating the waterways of the country.

SPECIAL PLEAS

All such special pleas as that of Mr. C., based as they are entirely upon self interests, must be considered in the light of the public welfare and the Commission undoubtedly will seriously consider as to whether or not it is sound public policy for the two governments to engage in an enterprise which amounts to a subsidy to such an industry as the Ford Motor Company, or whether it would not be better for the governments to pay the freight charges on the Ford machines to the point of destination; in other words, can the two nations afford to embark upon an enterprise of such magnitude as that under consideration to relieve the Ford Motor interests of paying the ordinary freight charges on the raw material and finished products, when it will cost those countries millions of dollars a year to maintain and operate the route, even if traffic over such route could be shown to be economically feasible; and this we contend cannot be shown.

SPECIAL INTERESTS

Many other special interests have been represented at your hearings making similar claims to those of the Ford Motor Company as to prospective savings on the transportation of raw material and finished products from centers remote from the Great Lakes. All such alleged savings are purely speculative and do not take into account the various elements of cost in the handling of such tonnage by rail and water from the point of origin to the point of destination. It must have appeared to the members of the Honorable Commission that many statements have no real basis in fact any more than the statement of Mr. Julius H. Barnes, that the proposed water route would save seven cents per bushel on grains from the upper lake ports to Liverpool. We have shown in our statement that the prevailing pre-war rate for a period of years were only 10.73 cents per bushel and it would be a physical impossibility to save seven cents out of that rate — and Mr. B. is one of the largest dealers in grain in the country.

If he made statements of that kind, what may be expected from those less informed whose imagination carries them beyond the confines of their better judgment? This is illustrated by the argument of representatives of several interior cities of the Central Western States.

ALLEGED INDIFFERENCE OF SOME ADVOCATES

The apparent cool indifference of such an advocate as Mr. I., Manager of the Indiana State Chamber of Commerce, disappears when he undertakes to enlighten the Commission on the "over stimulation of industrial activities in this country," found on page 7722 of the record. He attributes the high cost of living to lack of production in the rural districts, due to the young men leaving the farms and their gravitating to industrial centers and not to the lack of transportation facilities and he warns the members of the Commission not to be swayed by the rivalry of contending factions in our country, for he says, "Indiana is not concerned whether it hurts New York or helps Detroit for these things are selfish and local."

He overlooks the fact that New England does not look with favor upon the proposed improvement and that it will cost the rural as well as the industrial centers of New England millions of dollars as New England's share in the expense of the construction of such a waterway. (See Report of a Traffic League Committee at pages 7664-7680 of the record.) He also ignores the statement of Mr. William H. Chandler, Manager, Transportation Bureau, Boston Chamber of Commerce, who is also President of the National Industrial Traffic League and one of the best qualified men to speak upon transportation problems in this country, that, "no vessels could economically operate on the St. Lawrence route light in one direction and no one has yet shown that westbound cargo could be obtained on any route that would take eastbound cargo," and also the statement of Mr. Chandler that the "proponents of this measure — the St. Lawrence Ship Canal project — all appear to be theoretical seamen. It would be more convincing if some practical steamship man would advocate the plan and say that it might reasonably be expected that the St. Lawrence route would be of economic value to this country and that the project is practical from an operating standpoint; that there would be inducement for practical steamship men to put vessels on the St. Lawrence route and that profitable operation is possible, explaining the basis upon which such opinions are

founded. The engineering problems of the canal can best be judged by the studies made of those competent to speak with authority on this phase of the question. *The opinion of the layman is of little or no value in such matters.* Such surveys as have heretofore been made point out the great difficulties of construction and high cost of maintenance of a canalized St. Lawrence and so far as can be determined the engineers have in every case reported adversely upon the project being either a practicable waterway or an economic necessity.

He also ignores such statements as those of Mr. Wilfred H. Schoff, Secretary, Atlantic Deeper Waterways Association, an expert on the statistics of transportation problems, who has said, "that it would seem to be a most liberal estimate that would assign much more than one million tons as the volume of American grain that could be attracted to a lake route for export," basing such statement upon the fact that in 1913 the total volume of exports of grains from the United States from all ports was approximately only four and one-quarter million tons and in 1916 was only a little over four million tons, in round numbers.

He also ignores such opinions as those of Honorable Lewis H. Nixon, a ship builder of international repute and such successful owners and operators of lake and ocean vessels as Mr. Adam E. Cornelius of Buffalo, both of whom disapprove of the St. Lawrence Ship Canal project.

He also overlooks the fact that great portions of the Dominion of Canada are opposed to the project on account of its immense burden upon the people of the Dominion, expressed in such protests as that of the Shipping Federation of Canada, operating vessels on the high seas and in and upon Canadian waters, which protest is found at pages 7836-7848 of the record.

INDIANA'S ACTIVITIES

Mr. I. stated that Indiana "is seething with activity, ninety-eight to one hundred per cent of which is favorable to this great project," notwithstanding "the fact that we have no axes to grind." Of course, Indiana has no interest whatever in the improvement of the Ohio River or the contemplated improvement of the Wabash River. We think the Congress of the United States would welcome information from the southern counties of Indiana on this subject, and as to whether or not the inhabitants of those counties "are seething" for the expenditure of millions on the St. Lawrence to the neglect of the needed improvements of the

Ohio River. It is a fair inference from the arguments of the manager of the Indiana State Chamber of Commerce that the people of Indiana prefer that the government of the United States in the future should appropriate its moneys for the improvement of the St. Lawrence River project rather than for continuing the improvement of the Ohio or the contemplated improvement of the Wabash River.

DISTINGUISHED COMMISSIONERS.

The distinguished gentlemen who comprise the International Joint Commission on Boundary Waters, we trust, will scan with some care the statements made by some speakers, namely, that they represent large numbers of farmers and other interests who have never studied the St. Lawrence project in all its details and know little or nothing about the difficulties involved in the construction of such a project and the uneconomic phases of the operation of such a waterway through the St. Lawrence valley. We do not imagine any member of this Commission would be bold enough to claim he represented five thousand or even five hundred farmers on any question, as did Mr. L., Secretary of the Farmers Grain Dealers' Association of Ohio. He is to be commiserated in his responsibility for undertaking to represent so large a body of American citizens, as he stated he was authorized to represent at the Detroit hearing. It is quite probable that many farmers in those organizations have never had the opportunity of studying the problems involved and know little or nothing about them. It is a dangerous assumption on the part of any man to assert that he represents so large a number of American citizens (see record, page 7644, etc.) The Commission, however, will not be misled by such statements. It is possible that a small number of the farmers of Ohio may have adopted the resolutions incorporated in the minutes but we doubt very much whether or not the great body of farmers knew anything about them.

We are wondering how much weight your Honorable Commission will give to such opinions as that of Congressman-elect Mr. L. of Minnesota, found at pages 7726, etc. of the record, who said he would rather be a member of your Commission with, "an opportunity of taking affirmative action on this important question, looking at it from the viewpoint of serving my country and perpetuating my name in the annals of history than to serve a whole lifetime in the Congress of the United States."

The Commission will observe that without hearing the arguments for or against the proposition, he had fully made up his

mind to vote in the affirmative thereby wholly disqualifying him for acting as a judge in a matter of such stupendous physical, economical and constitutional problems as those under consideration. His opinion is something like those described by Bishop Hooker in his Ecclesiastical Polity, who said, "such subtle opinions as few but Utopians are likely to fall into, we in this climate do not greatly fear." He made the astounding statement at page 7729 that, "we are not dead in Duluth. We of Duluth have a vision, a vision we confidently hope will soon be realized."

BRILLIANT FABRIC OF SPECULATION

Let us say in answer to his vision, why construct a brilliant fabric of speculation that cannot sustain its own weight?

In considering the arguments of the proponents, we are tempted to paraphrase the statements of Adam Smith and William Cowper, in effect that the promoters of speculative enterprises usually promise themselves extraordinary profits,

"And fresh confidence take
From every proselyte they make."

Let us remember, however, that should the project prove a commercial failure and a waste of hundreds of millions of dollars, it will not even have the basis of a deal in futures, which may be adjusted by the payment of the difference in the prices between the actual and the speculative values of the commodities, for such an expenditure of millions of dollars will be sunk in the St. Lawrence's tumultuous waters and in the wasteful sea.

DIVERGENCE OF VIEWS

The honorable Commission will not fail to note the divergence of views of the several proponents of the project and the various conclusions drawn therefrom — and unwittingly Mr. R., President of the Detroit Board of Commerce stated at page 7749 that, "one can see just as far into a rock as another." He might have said one can see just as far into the fogs of the St. Lawrence as another, but he intentionally or otherwise piloted his

"..... painted ship
Upon a painted ocean "

far from the wreckage strewn along the bottom of the St. Lawrence, and made no comments on the physical obstacles to navigation of that "graveyard of the Atlantic."

Many of the speakers may have been more or less familiar with the operation of prairie schooners, but never have stood at the wheel of an ocean liner in such a restricted, tortuous, be-fogged and ice-flown channel as that of the lower St. Lawrence where in 1914 the "Empress of Ireland" collided with the "Storstad" and sacrificed more than one thousand human lives.

OBSTACLES TO THE CONSTRUCTION AND OPERATION OF THE ST. LAWRENCE SHIP CANAL

Evidently the proponents of the project have given little or no consideration to the obstacles in the construction and operation of such a waterway as that under consideration. It is doubtful if many of them have had any experience in such works. None of the ship canals in existence can be compared with that of the proposed St. Lawrence Ship Canal. They are all shorter and most of them are sea level canals or have but a slight lockage. Furthermore, most of them are not through befogged regions. All the existing ship canals are short cuts at sea levels or nearly so, connecting large bodies of water, except the Manchester, which is only thirty-five miles long and none of them involved such engineering problems as the proposed St. Lawrence Ship Canal, which would be closed by nature five months or longer each year and whose construction and operation would be attended by difficulties not encountered in the operation of any existing ship canal. At the present time, the dangers in navigating the lower St. Lawrence are reflected in the high insurance rates on vessels, at all times twice as great as the insurance rates on ocean-going vessels between New York and Liverpool, and in October and November four times the prevailing insurance rate between New York and Liverpool.

CANADIAN WATERWAYS

Among the proposed waterway improvements in Canada is the proposed Georgian Bay Ship Canal from the Georgian Bay up through the valley of the French river, across Lake Nipissing through Trout and Talcon lakes and up the Mattawa river to the Ottawa river, and thence down that river to its confluence with the St. Lawrence, just above the Lachine Rapids. The rise from Georgian bay to the summit level is only ninety-nine feet.

The proposed canal from Georgian bay to Montreal is to be 22 feet deep and 440 miles long, 80 per cent. of the distance is to be through natural channels. That route was surveyed in 1908.

The estimated cost of that waterway which was to have locks 600 feet long, 60 feet wide, with a 20-foot draft, was by one route \$99,686,000 and by the other route \$93,890,000 to both of which sums, however, was to be added the expense of a feeder at the summit level, which was to cost \$900,000.

We understand that project is still under consideration and when completed will constitute the shortest route from the upper lakes to the ocean.

The cost of the construction of the Georgian Bay Canal, including a feeder at the summit level was estimated in 1908 to be at one hundred million dollars, approximately, which is less than one-half the lowest estimated cost of the proposed St. Lawrence Ship Canal, including electrical equipment for the latter.

The probability is, however, that the St. Lawrence Ship Canal and Power Project will cost, it is said, one billion and one hundred million dollars, and if the Dominion of Canada be called upon to pay one-half of that expense; namely, five hundred and fifty million dollars, it is five and one-half times the estimated cost of the Georgian Bay Ship Canal.

That is but one of the many waterway projects the Dominion of Canada has under contemplation.

Manitoba and Saskatchewan are urging the construction of a ship canal through and from the Lakes of Manitoba down the valley of the Nelson river to Hudson bay. Fully two-thirds of the distance of such a waterway from Winnipeg to Hudson bay would be through Lake Winnipeg and other lakes and down the Nelson river. The cuts and artificial construction of such a waterway would not exceed 25 per cent. of its length, all of which is in valleys. Such a waterway would afford direct communication with the ocean and afford the cheap transportation which these great wheat-producing areas require.

It is inconceivable that the people in those provinces will ever consent to expending millions of dollars in such a project as the proposed St. Lawrence Ship Canal, when they have a feasible route within their grasp and at only a small part of the cost of that estimated for the St. Lawrence Ship Canal project.

INCONCEIVABLE THAT CANADIAN PROVINCES WILL FAVOR THE PROJECT

It is likewise inconceivable that the provinces of Nova Scotia and New Brunswick will ever consent to the expending of millions of dollars of Canadian money in the St. Lawrence Ship Canal project, when they have so many rivers and harbors needing improvement and equipment within their own confines, and so many water-power resources that may be developed.

If there be one predominant attribute of the people of the Dominion, it is that of sound judgment and they are not likely to be beguiled by any such spectacular arguments as have been made before this honorable Commission, in which Canadian interests were extolled to a degree never known before. Canadians are not likely to be deceived by the gift-bearing Greeks, and led to part with their water power resources in the St. Lawrence below the International Boundary Line, estimated at 2,500,000 horse power.

Why should Canadians surrender their potential energies so much needed or that in the future will be needed in their industrial development, to the United States or to any other government to be exported to a super-power transmission line east of the Appalachian mountains or elsewhere remote from Canadian industries? Why surrender such national resources to others to be trafficked in by political or other powers?

NEW YORK WILL NOT SURRENDER ITS WATER-POWER RESOURCES IN THE ST. LAWRENCE

For similar reasons New York State will not surrender its vested interests in water powers, submerged lands and riparian rights south of the International Boundary Line. Such water powers, submerged lands and riparian rights, except for the purposes of navigation, cannot be taken by the United States or by any other government without making just compensation to the owners thereof, and the value of such rights will aggregate unknown millions of dollars, which will swell the cost of the project enormously.

THE UNITED STATES DID NOT UNDERTAKE THE WATERWAY REPORTED ON IN 1900

The United States Government on the receipt of the report of the Board of Engineers of the United States Army on Deep Waterways between the Great Lakes and the Hudson River, in the year 1900, concluded not to go forward with that project, for

reasons among others on account of its great cost and doubtful economic value. It was apparent to the engineers and others, who studied the matter, that such a ship canal was of very doubtful practicability and certainly would accomplish no economy in the transportation of the tonnage of the Great Lakes to the sea over the New York route. Subsequent investigation on the part of the State of New York led to the same result, as is shown in the Roosevelt Commission report and in the report of the late Colonel Thomas W. Symons, contained in House Document 86 of the first session of the Fifty-fifth Congress. That report will undoubtedly receive careful consideration on the part of the members of the Commission as it deals directly with the relative cost of transportation by vessels navigating different bodies of water, such as the Great Lakes, restricted channels, and the ocean. Colonel Symons gave much time to the investigation of that subject and his report is as complete and as conclusive as any that has ever been submitted to Congress on the subject. Later, the Honorable William C. Redfield, Secretary of Commerce, in response to a resolution of the United States Senate, made a report on the feasibility and advisability of a ship canal between Lake Erie and Lake Ontario in which he strongly opposed the construction of such a waterway and assigned his reasons therefor at some length. That report is one of the Senate documents, which ought to be obtainable in the Government Printing Office in Washington, or in the office of the Secretary of Commerce.

OTHER REPORTS CITED

The Commission will recall the fact that at the New York hearings, the Assistant Secretary of Commerce promised to furnish the Commission with a copy of that report and we trust that the Commission may have it before reaching any conclusion in the matter under consideration.

Quite recently, in House Document No. 890 of the third session of the Sixty-sixth Congress, Major General Lansing H. Beach, Chief of Engineers, United States Army, also reported at some length on a waterway between the Great Lakes and the Hudson River. That report shows the tonnage on several of the Canadian canals and reviews at some length reports theretofore made by commissions and engineers on such a proposed waterway. This last report will undoubtedly also receive the careful consideration of this Honorable Commission.

The attention of the Honorable Commission is also called to the argument filed by the New York Commission on or about December 29, 1920, which was subsequently embodied in the Preliminary Report of the Commission created pursuant to Chapter 806 of the Laws of 1920, State of New York, which was sent to the Commission in the month of January, 1921. That report reviews at some length the available material from official sources bearing on the whole project under consideration. Under Point I it is shown that there are no economic advantages in a ship canal down the St. Lawrence River. Under Point II is discussed power development and under Point III the legal questions involved in the project. That report summarizes the conclusions of many commissions and expert authorities on the subject of such a waterway as that under consideration and discusses at some length many other questions to be considered in reaching any conclusion on the subject-matter referred to the Commission. It is based on official and other indisputable data and on decisions of the House of Lords and Supreme Court of the United States. Other decisions might be cited but they would simply extend but not modify the conclusions stated in such Preliminary Report. There can be no question but that under the Constitution of the State of New York as well as under the Constitution of the United States the title to the water rights and lands south of the international boundary line belong to the people of the State of New York and are within its sovereign control and that neither the State of New York nor the record owners thereof can be divested of such rights by any power on earth, except the United States Government for the purposes of promoting commerce in the St. Lawrence but not for power development purposes, and the action of Congress or the Secretary of War in determining the amount of such waters as may be necessary for commercial purposes is reviewable in the courts of the United States under the Fifth Amendment to the United States Constitution.

Some of the information embodied in such Preliminary Report will be found in House Document No. 1591 of the third session of the Sixty-fifth Congress, to which reference is herein made.

The attention of the Commission is also called to House Document No. 755 of the second session of the Sixty-fifth Congress on Harbors and Connecting Waters of the Great Lakes, for the purpose of studying those problems as corollary to the major pending proposition. If the St. Lawrence Ship Canal were to be built, then the harbors and connecting waters of the Great

Lakes must be deepened, or the ship canal would be of no use for vessels of more than 20 feet draft. The expense of deepening such connecting channels of the Great Lakes and the harbors thereof may be ascertained from such documentary evidence as House Document No. 755 of the second session of the Sixty-fifth Congress, and from the estimate made in 1900 by Mr. George Y. Wisner of the Board of Engineers on Deep Waterways, found in volume 26 of the Proceedings of the American Society of Civil Engineers, at page 992, wherein he estimated the cost of deepening the connecting channels and harbors of the Great Lakes would be \$7,000,000 for each additional foot in depth, imposing an annual charge for maintenance of \$245,000 for each foot in depth. He made his estimate in the year 1900 but the cost of the work at the present time would be not less than \$12,000,000 for each additional foot in depth and would impose an additional charge for maintenance of \$450,000 for each additional foot in depth. If such channels be widened as well as deepened the cost now may be twice the cost estimated by Mr. Wisner in the year 1900.

It appears from the official report of the United States Government that appropriations for the survey, improvement and maintenance of the harbors, channels and tributary streams of the Great Lakes and St. Lawrence River down to March, 1907, aggregated \$97,791,108, and since the year 1907 large appropriations have been made annually for that purpose as the various river and harbor appropriation bills will show. For instance, the appropriation made for improving the Livingston Channel in the Detroit River by the Sixty-fifth Congress amounted to \$844,000, and for the improvement of the harbor at Ashtabula, Ohio, by the Sixty-fifth Congress \$612,000. These are only two items in annual appropriation bills and there are many others. Other appropriations on the Detroit River prior to 1907 amounted to \$5,854,500, while there have been appropriated prior to 1907 for the Chicago, Calumet, Milwaukee and Michigan City harbors, a total of \$10,309,555, and the harbors of Lake Erie had appropriated for them a million dollars or more.

TOTAL APPROPRIATIONS FOR RIVERS AND HARBORS

The total appropriations for rivers and harbors for nearly a hundred years down to July 1, 1920, as given by the Chief of Engineers, United States Army, amounted to the grand total of \$1,036,015,709.36. Colossal as are these aggregate appropriations for river and harbor improvements, they do not total as

much altogether as the estimated cost of the improvement of the St. Lawrence, placed by the best authority in the country at \$1,100,000,000, including interest and other items chargeable to cost of construction prior to operation.

It is possible that the estimates of the United States and Dominion engineers making the surveys and estimates on the St. Lawrence Ship Canal power project may not agree with the estimates of Colonel Cooper. Their estimates may be larger or smaller, but whatever they be, there are certain unknown elements in the problem that cannot be determined in advance, such as water power and land damages likely to run into large sums of money. These unknown factors in Barge Canal construction in New York exceeded the estimates and original appropriations from twenty-five to thirty-five per cent. The New York project, however, involved but few power dams and no lands were flooded. Its primary purpose was for the transportation of tonnage and not for power development but still the costs have exceeded the original estimates by from twenty-five to thirty-five per cent.

ADDITIONAL COSTS FOR DEEPENING HARBORS AND CHANNELS OF THE GREAT LAKES

What the additional costs above the estimates in a project as great as the St. Lawrence Ship Canal and power project will be no one now can safely predict. This is all additional to the enormous expense to the two governments for improving their harbors and deepening their respective connecting channels. How much those sums will aggregate is indicated by the estimates made by Mr. Wisner hereinbefore quoted. Mr. Wisner's estimates did not include, however, the enormous expense that would devolve upon each city for improving its waterfront to a depth sufficient to accommodate the ocean-going vessels from the main governmental channel to the wharves of such municipality. The cost of such improvements may be approximated possibly from the cost of improvements in New York Harbor, Philadelphia, Baltimore, Boston, Portland and other Atlantic ports and from such ports as Montreal, Chicago, Duluth and other Great Lakes cities and from such foreign ports as Liverpool, London, Edinburgh and Dublin.

It is quite possible that the advocates of the project have not called attention to such enormous local expenses as the improvement of their respective harbors will entail upon them if such

ports are to derive any benefit whatever from the proposed waterway. We doubt very much whether any one of the up-lake cities on a popular vote would bond its property to the extent of millions of dollars to make its local channels navigable for ocean-going vessels. It would be necessary to have some such series of wharves as those of Liverpool, seven miles in extent and costing millions of dollars, if the up-lake ports are to derive any such benefits from ocean ship navigation as represented by the advocates of the project. It is fair to assume that these enormous local expenses have not been considered nor even presented to the cities of the up-lake ports.

The attention of the Commission, is respectfully called to the memorandum found on page 7836, etc., submitted by the Shipping Federation of Canada which comprises several oceanic corporations whose officers and members are thoroughly familiar with navigation problems. They have advanced several important factors to be considered in solving the problem. They speak with full knowledge of the difficulties attending the construction and operation of such an interior waterway. They also call attention to the dangers of converting the St. Lawrence into a power development raceway on account of the draft of the water of Lake Michigan and other lakes whereby the levels thereof may be so lowered as to render navigation dangerous thereon, and in this connection they call attention to the draft of the waters of Lake Michigan through the Chicago Drainage Canal. They also call attention to the inadvisability of the construction of canals in Canada to be operated internationally by the two governments. There are many points in that memorandum so submitted, worthy of careful consideration on the part of the Commission and such points have not been so well otherwise presented by any other opponents of the project.

Attention is also called to the documentary evidence transcribed of engineer's reports and other data presented in opposition to the project at the Buffalo, New York and other hearings. It is not necessary nor would it be wise to undertake to review in extenso that material. We trust, however, the Commission will not fail to read the transcripts of records showing the movement of tonnage on the Great Lakes and that not to exceed one-tenth of that tonnage ever reaches the seaboard and a still smaller percentage is destined for export.

The attention of the Commission is also called to the testimony of record made by the opponents of the project in relation to the

physical conditions incident to the construction and operation of such a waterway 2,250 miles in length from the high seas up through the Gulf of the St. Lawrence, the tortuous channels of the St. Lawrence River and up through the locks and canalized reaches thereof to Lake Ontario, and thence on up through the Welland Canal, Lake Erie, the Detroit River, Lake St. Clair, St. Clair Flats, Lake Huron, St. Marys River and the Locks at "The Soo," and thence up through Lake Superior. How long it would take an ocean-going vessel, traveling as slowly as it would be necessary for it to travel through that long, tortuous channel beset with locks and other obstructions to navigation, no one can definitely state, but it must be apparent to the Commission that the navigation of such a waterway by an ocean-going vessel would consume two or three-fold the time consumed by such a vessel in navigating a similar distance on the high seas and in these days when the cost of operation of ships is so great, the freight rates on vessels through such a restricted waterway would undoubtedly be two or three times the freight rates on the high seas for similar distances.

The attention of the Commission is also called especially to the papers of Hon. Lewis Nixon, Mr. Adam E. Cornelius, Hon. George Clinton, Mr. Frank S. Gardner, Mr. E. Platt Stratton and Hon. Merton E. Lewis on the general subject, "The St. Lawrence Ship Canal Proposition," printed in pamphlet and forwarded to the Commission some months ago, copies of which, with other exhibits, accompany this answer.

NEW YORK'S OPPOSITION NOT SELFISH

Strange as it may seem, as already stated, the position of New York has been charged by the proponents of the project as due entirely to its selfish interests. We wonder what the charge will be as to New England and as to Canada and as to such states as New Jersey, Pennsylvania, Delaware, Maryland and in fact as to all of the Atlantic States? Without seriously investigating the facts, being spurred on by some unseen power except it be the power companies who have appeared at the hearings, many individuals and organizations have committed themselves to the project, visionary as it has been shown to be. These good people have been flooded with partisan literature of a character to make the worse appear the better reason, and not having recourse to such information as might show the real conditions surrounding the project, have

undoubtedly subscribed moneys in large amounts to continue the *campaign* which has assumed great proportions.

ACTIVITIES OF OTHER STATES

The Commission will see by perusing the reports from various states contained in the record of Detroit that considerable sums of money were appropriated to promote the project by several states and communities throughout the Central West. These contributions were entirely additional to what the power interests may have contributed and when we consider the lack of funds to publish literature in opposition thereto, much less to pay salaries of any kind or description, we are reminded of what Thomas Erskine said on the impeachment of Warren Hastings in reply to Edmund Burke. Lord Erskine said:

“The gentlemen of the law have been considered by him as no genuine members of the House, but as only perched there as birds of passage in their way to another. I can only say for myself, that if I had meant only to rest in this place, in the course of such a pursuit, I should hardly have lighted on the *naked bough*, which supports me, but have sought the *luxuriant and inviting foliage*, which overspreads the opposite side of the House, which would have afforded me kind shelter and have accelerated my flight.”

The opponents of the project are actuated by no selfish motives whatever, but have stated the grounds of their opposition which are entirely of a public nature. It had been much easier, as Lord Erskine suggested in his reply to Burke, for the opponents to have yielded and sought the luxuriant and inviting foliage, which overspreads the side of the proponents than to take up arms against a sea of troubles and undertake to withstand the “seething” activities of Indiana and other western states. (See Record, page 7725.) The opponents, however, are thoroughly convinced that the proposed project is uneconomical and the outgrowth of speculative rather than practical views; that neither the United States nor Canada will profit by such a joint enterprise; that if constructed, such a waterway will not furnish the relief which is claimed for it; that it will entail an enormous expense upon both nations, already over-burdened with war and other debts, without any adequate return; that both nations have waterway improvements of such proportions and of such impor-

tance and necessity that they ought to be carried forward as speedily as can be done from the funds that can be wisely appropriated for such approved waterway improvements and those funds ought not to be wasted in a problematical enterprise of the character of that under consideration.

DIFFICULTIES INCIDENT TO THE CONSTRUCTION OF VAST PUBLIC WORKS

The Commission will recall engineering and other difficulties attending the projection, construction and operation of such maritime canals as the Manchester, Amsterdam, Corinthian, Kaiser Wilhelm, Suez and Panama Canals and also the expense involved in canalizing such rivers as the Rhine, the Rhone, the Nile, the Thames, the Elba and other canalized rivers for ocean-going vessels. We assume the Honorable Commission will take judicial notice of all such waterways and will consult the records on the engineering, operating and economic phases of such ship canals. Experience has demonstrated that several of such canals were inadequate for ocean-going vessels of large draft and when completed according to original plans, had to be enlarged to meet the deeper draft vessels. In 1907 Sir John Wolfe Barry, at a congress in London, said:

“I happen to have been on the technical commission of the Suez Canal for many years with my friend Sir Charles Hartley and we—the British representative engineers—have persistently year after year in season and out of season for the last 15 years—urged upon the authorities of the Suez Canal the extreme importance of deepening the canal to the depth which is now nearly realized, of 10 meters.”

It must be apparent to the Commission that the St. Lawrence canalized to accommodate vessels of 20 feet draft would not suffice for modern commercial purposes nor would a canal admitting vessels having a draft of 25 feet long serve such commercial purposes, even though the project were commercially practicable, for ocean-going vessels to successfully compete in the ocean carrying trade must have draft enough to admit of carrying large cargoes. The members of the Commission are familiar with the fact that along the Atlantic and Gulf coasts may be seen many so-called “tramp” steamers that have been superseded in the ocean carrying trade by the large liners of much deeper draft and greater carrying capacity.

VESSELS OF 30 FEET DRAFT ARE NECESSARY IN OCEAN SERVICE

If the St. Lawrence River were to be canalized — which we believe to be entirely unwarranted — it should be deepened enough to admit of its navigation by vessels having at least 30 feet draft. Ten years ago or more Mr. Eich, chief engineer of the Kaiser Wilhelm Canal, who had given careful study and consideration to the size of ocean-going vessels, in substance recommended that the dimensions of merchant ships for the future be not less than 984 feet long, 105 feet wide with a draft of 38 feet, and European locks and wharves before the war were being constructed to accommodate vessels of those dimensions. The merchant vessels of the Trans-Atlantic lines of Great Britain were fast approaching the dimensions above stated.

So from these expert and other authorities it will appear that the small ocean carriers are being replaced by the larger vessels of 30 or more feet draft and having a carrying capacity of 15 or more thousand tons. Therefore, the ocean-going vessels of 8,000 tons navigating the high seas and the Great Lakes could neither compete with ocean carriers of 15,000 tons carrying capacity nor with lake carriers of 14,000 tons carrying capacity; in other words, the ordinary ocean rate would be far below the rate of a vessel navigating both the ocean and the Great Lakes and the ordinary lake freight rate would also be lower than the freight rate on such vessels navigating both the ocean and the Great Lakes. Accordingly, lake and ocean cargoes would follow the lines of least resistance and pass from the upper lake ports on Great Lakes vessels and from the Atlantic seaports to European ports by ordinary ocean carriers, and especially when the intervening water rate over the canal system of New York is as low as the water rate could possibly be down the St. Lawrence.

OCEAN FREIGHT RATES

The low ocean freight rates have not been given sufficient consideration in the hearings before your Honorable Commission, although it now appears in the combined freight rate which we are submitting with this answer in the statement of the Canal Traffic Agent of the State of New York on page 2 of Exhibit No. 1, being page 40 of this report, that such rate on grain from

the head of the Great Lakes to Liverpool via the New York water route was only 10.73 cents per bushel. It will not be possible for any vessel navigating all three bodies of water, viz, the Great Lakes, the St. Lawrence River, and the ocean, to carry freight from the head of the Great Lakes to any European port at 10.73 cents per bushel, although that low rate was the average cost of transportation per bushel of wheat for five years from 1910 to 1915, as appears in the above mentioned exhibit. In other words, the lake rate, the New York canal rate, and the ocean rate, together with terminal charges, insurance, all combined, is lower than can be realized in uninterrupted movement via lake, St. Lawrence River and ocean.

RAILROAD CARS ARE NOW AVAILABLE IN ALL PARTS OF THE COUNTRY

The Commission will not be misled by such statements as those contained in the record with reference to the inability to obtain cars for the movement of freight from the states represented by the speakers from certain sections of the fourteen states proposing the construction of a ship canal down the St. Lawrence, for it is well known that transportation facilities were subordinated to governmental exigencies and the railroads have only recently been returned to their owners, but in such a dilapidated condition by reason of lack of repairs being made during the war period, that it may take some time to restore them to their normal efficiency; however, this is now being done and undoubtedly the railroads will be performing their normal functions long before the St. Lawrence Ship Canal project can be constructed, even though it were undertaken. Such projects require years of time to plan and carry to completion as illustrated in all the great ship canal projects of the world. The members of the Commission will recall the 50 years' time which has already been spent in seeking to improve the Ohio River and that many years have been spent in improving the Mississippi, the Tennessee and other water-way projects. It is not likely that the St. Lawrence project, beset with physical and other difficulties far more serious than any encountered in the construction of the Panama and other ship canals, will be completed if undertaken, within the life of the present generation; so those most insistent on the project are not likely to live long enough to see it completed.

OPPORTUNITY REQUESTED TO INSPECT THE REPORT OF THE
ENGINEERS WHEN COMPLETED

The Honorable Commission will recall the fact that at Detroit we requested that opportunity be given to the opponents of the projects to inspect the reports of the engineers, when those reports were completed and they be also given an opportunity to appear before the Commission and make any suggestions that such opponents may consider pertinent to the problems involved. As we recall it, that request was neither granted nor refused and the matter held open, presumably for the executive session of the Commission. May we not again urge upon the Commission the importance of such request being granted? It is quite possible that other engineers, expert in dam and lock construction and in the construction of hydro-electrical plants of such large dimensions as those that must be constructed to withstand the tumultuous flow of the St. Lawrence, may be able to make valuable suggestions to the Honorable Commission in relation to the stupendous matters under consideration. The Commission will recall the fact that in the construction of the Panama Canal with its flight of locks, the best engineering talent in the country was engaged. The St. Lawrence project, however, is so much greater that all the engineering talent of the two countries may be required to solve the problems incident to the construction of that project. Very few engineers are so expert in all phases of such problems as to be able to pass upon them. Engineers specialize as do all other skilled artisans, and while some are proficient in lock or dam construction, others are expert in hydro-electric construction, and but very few are familiar with dam construction, lock construction and hydro-electrical construction; and it would seem to be the part of wisdom for the Commission to welcome suggestions from expert authorities outside of the engineers appointed to make the original investigations and prepare the preliminary estimates. Certainly the Congress of the United States and presumably the Parliament of the Dominion of Canada will welcome information on the engineering problem involved in the subject, if it is to be undertaken. It is so large that it is doubtful as to whether any dozen engineers can master all the problems involved sufficiently to warrant the two governments expending hundreds of millions of dollars in its prosecution.

Little or no light has been thrown upon the subject at the hearings and such information as has been presented along engi-

neering lines to the Commission on the part of the proponents is based primarily and almost wholly upon the interest of the organizations represented. It is not strange that the Canadian Deep Waterways and Power Association, The Aluminum Company of America, the advocates of the super-power project between Boston and Washington and their allied subordinate organizations in both countries favor the project which will cost those organizations nothing, for they have everything to gain and nothing to lose, whereas with the taxpayers of the two nations, if the project be a failure, it would entail a financial burden so colossal, that neither the reputed wealth of Ormus, nor of Ind, would have sufficed to discharge it.

UNDEVELOPED WATER POWERS OF NEW YORK AND OF THE UNITED STATES

Attention has been called to the undeveloped water powers in the State of New York and in the United States remaining to be utilized, as to which there can be no international, political or legal complications. These undeveloped water powers were reported upon by the Secretary of Commerce as aggregating 50,000,000 horsepower within the United States.

Is it a wise governmental policy for the United States to suffer such undeveloped water powers to remain as they are in order that the Government may invest public funds in the development of the St. Lawrence River in conjunction with the Dominion of Canada, or would it not be a wiser policy to utilize its undeveloped water powers within its own territory? In case of international complications, how easy it would be, with the generating plants within the confines of Canada, to turn off the power developed along the St. Lawrence, thereby putting out of business the industries being supplied therefrom! During the recent World War Canadian power generated at Niagara was turned off from Buffalo industries and it became necessary to install an auxiliary generating plant to supply the city with its electrical energy. This condition arose when the two nations were in friendly accord, but the exigencies of Canada were such that it needed all the power developed within its boundaries. Similar conditions may arise in the future in case Great Britain were involved with any other foreign power and therefore make it necessary to utilize the resources of Canada and such power, even though generated at the joint expense of the two nations, necessarily would be required for use within the Dominion of Canada.

MANY SUGGESTIONS PRESENTED TO THE INTERNATIONAL JOINT COMMISSION

These and many other suggestions have been presented in various forms to the Commission at its hearings and attention is again called to them in order that they may not escape the notice of the Commission. The preliminary report of the New York-St. Lawrence Ship Canal Commission and the data presented at the several hearings of the Commission in Buffalo and New York undoubtedly will be read by the members of the Commission in order that its members may have whatever advantages are to be derived therefrom in the disposition of the monumental problems under consideration.

THE EASTERN STATES ARE OPPOSED TO THE PROJECT

The great East is interested in such matters much more than may have been made apparent to the Commission. None of its commercial centers favor the project, not on account of jealousy of our friends across the border, because no such jealousy exists, but rather on account of the useless burden which will be imposed upon the Eastern States. They have had much experience in waterway development. They appreciate more keenly than communities out of touch with water transportation the burdens incident to waterway development and the hazards incident to such a project as that of the improvement of the St. Lawrence River. If all the grain of the lake region were to go through the Port of Montreal, it would not seriously affect the commerce of the Port of New York, so New York does not fear any rivalry from that source; therefore the charge is not true that New York's opposition is based upon any such grounds as those stated by the proponents of the project. New York, however, does oppose the expenditures of hundreds of millions of dollars, in addition to the great burdens it is already bearing, in the construction of a ship canal down the St. Lawrence, which it believes will be an economic failure. New York has a right to speak on the subject, because it has had more experience than any other State in the Union and has done more to improve waterway transportation than any other five states in the Union; and it realizes how far short all large waterway projects may be of fulfilling the predictions of their promoters.

In case the Honorable Joint Commission conclude to allow the members of the New York Commission to read the reports of the engineers employed by the two governments on the project, and

then to offer any suggestions in relation thereto, may we not ask the Honorable Joint Commission to so notify us.

April 21, 1921.

All of which is respectfully submitted,

LEONARD W. H. GIBBS,
Chairman.

MURRAY HULBERT,
Vice-Chairman.

HENRY W. HILL,
Acting Secretary.

CHARLES L. CADLE,
FRANK M. WILLIAMS,
JAMES J. WALKER,
SIMON L. ADLER,
CHARLES D. DONOHUE,
*Commissioners on the part of
the State of New York.*

EXHIBITS REFERRED TO IN THE FOREGOING ANSWER

EXHIBIT No. 1

Chas. L. Cadle,
Superintendent,
J. W. Grady,
Canal Traffic Agent.

STATE OF NEW YORK SUPERINTENDENT OF PUBLIC WORKS BUREAU OF CANAL TRAFFIC ALBANY

April 14, 1921

HON. HENRY W. HILL, *Acting Secretary,*
St. Lawrence Ship Canal Commission of New York State,
906 Mutual Life Bldg.,
Buffalo, N. Y.

MY DEAR SENATOR HILL:

By direction of the Superintendent of Public Works, I submit herewith statistics as to canal grain commerce for a period of years prior to 1910, together with information relative rate of

transportation prevailed during those periods by Lake, by Erie Canal and by Ocean from New York. The statistical data should be prefaced with an explanation that conditions of recent years, say from 1915 to the present time, provided no basis for precedent whereon the cost of transportation via the New York canals from Buffalo to Tidewater may be measured. It is common knowledge that the reconstruction of the canal system of this State, dating from 1903 to 1918, seriously interrupted the flow of traffic through the original Erie Canal, disrupted the canal transportation organization and had the effect of depressing the volume of canal commerce to a point where it was practically negligible. Therefore, such rates as may have obtained for transportation on the waterway of this State during the reconstruction period or subsequent to the completion of the canal, are of little value in measuring the efficacy of the waterway as an economical route of transportation between the Great Lakes and the Atlantic Ocean.

Authentic records are not maintained in the Department of the Superintendent of Public Works antedating the year 1890. From the year 1890 to 1900, at which latter date sentiment had crystalized on a project to deepen and otherwise improve the canals, the volume of wheat transported to New York and the rate in effect was as follows:

Year	Bushels	Rate
1890	11,789,700	3.87
1891	25,203,366	3.53
1892	20,690,933	3.44
1893	36,446,600	4.65
1894	30,116,266	3.13
1895	3,345,500	2.20
1896	13,629,033	3.70
1897	6,001,166	1.84
1898	2,332,866	2.87
1899	9,414,066	2.92
1900	4,610,083	2.51

During the same period, lake freight rates as recorded in the Department of the Superintendent of Public Works, from the Upper Lakes to Buffalo were

1890.....	1.98
1891.....	
1892.....	2.21
1893.....	1.66

1894.....	1.24
1895.....	1.80
1896.....	1.60
1897.....	1.25
1898.....	1.69
1899.....	2.50
1900.....	1.82

The figures cited, therefore, show that the average freight rate in cents per bushel on wheat from the head of the Great Lakes to Buffalo, thence to New York by canal was —

Average lake	1.775
Average canal	3.151
Average thru rate	2.463

Taking a more recent period, that of 1910 to 1915, which period is considered as more truly representative of present-day conditions, the rate of freight by lake to Buffalo and by canal to New York was as hereafter shown:

Year	Lake	Canal	Through
1910	1.06	4.08	5.14
1911	1.03	4.36	5.39
1912	1.36	4.32	5.68
1913	1.40	4.57	5.97
1914	1.28	4.27	5.55
1915	1.33	4.47	5.80
Average —	1.243	4.345	5.588

During the 1910-1915 period, the average ocean rate from New York to Liverpool was 5.15 cents per bushel. This information is derived from the official records of the New York Produce exchange and is authoritative.

The average cost of transportation per bushel of wheat from head of the Great Lakes to Liverpool via the "all water" route through Buffalo and the port of New York was 10.73 cents per bushel.

In citing figures of this character, particular emphasis should be laid on the fact that the bases named represents the transportation charges assumed by the commodity and not the cost of transportation as reflected in the charges of lake vessel, canal barge

and ocean vessel operations. Such latter figures are of course appreciably less than the rate of transportation under which the grain moved and a clear distinction must be made between "cost of transportation" as applied to the ship operator and "cost of transportation" as assumed by the consignee or consignor.

Moreover, the rates named include the transportation service via lake, canal and ocean and the incidental terminal service involved in transfer from lake vessels to canal barge and again to the ocean carrier.

The rates named are gross rates and there is absorbed therein the cost of the following operations:

1. Elevator charge at upper lake port.
2. Lake cargo insurance.
3. Lake transportation to Buffalo.
4. Elevator charge at Buffalo.
5. Five days free elevator storage at Buffalo.
6. Canal cargo insurance.
7. Canal transportation to New York.
8. Elevator charge at New York.
9. Three days free storage on canal barge at New York.
10. Five days free elevator storage at New York.
11. Ocean cargo insurance.
12. Transportation via ocean.

In any comparison of the rate of transportation yielded by any other water route either present or prospective, the charges covering the 12 factors above cited, should be included if an accurate relative cost is to be achieved.

It is the belief of canal officials of the State of New York, as well as interests operating barge equipment on the New York canals, that the rate of transportation on grain from Buffalo to New York can and ultimately will be materially decreased from the existing basis. The rates as effective during the past three years were initiated by the United States Railroad Administration and bear little relation to the cost or value of the service.

Likewise, the somewhat weak transportation organization contributed to a higher freight rate; but with the development of a strong scheme of transportation and the introduction of a modern barge equipment, it is certain that within the course of one or two years, rates of transportation via the canal will show a

marked decline. As illustrative of this situation, it should be noted that there were only two common carrier organizations providing a transportation service on the waterways of this State during the season of navigation of 1920; whereas, with the restoration of navigation for the season of 1921, there will be 8 or 10 well equipped strongly financed transportation companies trading on the waterways, owning or controlling, and operating barge equipment having a cargo capacity in excess of three million tons per year. Such capacity is in excess of 50% greater than the capacity of preceding years and indicates the rapid progress that is being made in the development of carrier organizations and the rehabilitation of commerce on the Barge Canal.

Of particular importance in the grain trade is the inauguration of a service by the MacDougall-Duluth Shipbuilding Company of Duluth, Minn., which concern will operate five self-propelled cargo barges having a capacity of 1500 gross ton each, capable of transporting 56,000 bushels of wheat each. The capacity of these barges is almost the equivalent of an average freight train and exceeds the capacity of the old type barges by 800 per cent. It should be obvious to any student of transportation that the cost of operation of equipment of this character carrying cargo in the volume cited, would be infinitely less than the cost resulting from the operation of obsolete equipment and such decreased operating costs naturally would be reflected in the freight rate.

It is the belief of canal operators that in the fulness of time, the rate of freight on wheat from Buffalo to New York by way of the Barge Canal can be decreased to five cents per bushel gross.

Respectfully submitted,

J. W. GRADY,

Canal Traffic Agent.

Approved:

C. L. CADLE,

Superintendent of Public Works.

P. S.—The average ocean rate, New York to Liverpool, as cited is exclusive of the rate for the year 1915, during which year, because of war conditions, ocean rates reached abnormal levels.

EXHIBIT No. 2.

Annual average freight rates on wheat per bushel, from Chicago to New York by lake and canal and by lake and rail, and from New York to Liverpool via ocean, for the years 1900 to 1914, inclusive.

Year	† By lake and canal Cents	By lake and rail Cents	New York to Liverpool * Pence
1900.....	4.92	5.05	33 ³ / ₈
1901.....	5.64	5.57	11 ¹ / ₄
1902.....	5.75	5.78	17 ⁷ / ₁₆
1903.....	5.94	6.17	17 ⁷ / ₁₆
1904.....	5.21	5.02	11 ¹ / ₈
1905.....	6.01	6.29	15 ⁵ / ₈
1906.....	6.44	6.40	17 ⁷ / ₁₆
1907.....	7.18	6.97	13 ³ / ₄
1908.....	6.50	6.50	19 ⁹ / ₁₆
1909.....	5.85	6.88	15 ⁵ / ₈
1910.....	5.60	6.54	11 ¹ / ₂
1911.....	5.87	5.23	2
1912.....	6.07	6.42	31 ¹ / ₁₆
1913.....	6.20	6.81	21 ¹ / ₁₆
1914.....	5.81	6.54	3

† Rates include one-half cent per bushel elevation at Buffalo.

(*) A pence is equivalent to 2.03 cents on basis of \$4.8665, the normal value of the English Pound Sterling in American money.

(Authority—Annual Statistical Report of the New York Produce Exchange for the year 1916—page 72.)

EXHIBIT No. 3

BUFFALO CHAMBER OF COMMERCE

TRANSPORTATION BUREAU

April 18, 1921

HON. HENRY W. HILL, 906 *Mutual Life Building, Buffalo, N. Y.:*

DEAR SENATOR.—In conformity to your request for the information I gained from the Shipping Board while recently in Washington, relative to the adaptability of their boats to Great Lakes service, desire to state that I conferred with Mr. Felton of the Shipping Board and went into the matter of the practicability

of using some of their smaller boats on the Great Lakes, and was informed that none of the Shipping Board boats was adapted for this traffic owing to their being constructed for ocean traffic.

I was informed that these boats draw from 27 feet upward, whereas the greatest draft which can operate on the Great Lakes is about 21 feet. I learned that the boats of the particular type — the so-called "Lake" type, although it has no connection with lake boats — when light draw 17 feet or more. Mr. Felton used as an illustration a boat of 4,000 tons capacity, drawing 27 feet, and showed that such a boat could not be loaded in excess of 2700 tons or between 65 and 70 per cent of her capacity owing to the maximum draft available on the Great Lakes. Owing to these conditions this type of boat could not be operated economically and to advantage on the Lakes.

For the reasons above given, Mr. Felton told me that the Shipping Board had refused to assign any boats to the Great Lakes, although they had received requests from various sources to allocate boats to the Lakes.

Yours very truly,
(Signed) FRANK E. WILLIAMSON,
Traffic Commissioner.

EXHIBIT No. 4.

April 13, 1921.

HON. HENRY W. HILL, 906 *Mutual Life Building, Buffalo, N. Y.*:

MY DEAR SENATOR HILL.— Complying with your request, I am forwarding you, under separate cover in duplicate, the following publications relative to the canal system of the State:

Set of navigation charts for the Erie, Champlain, Oswego and Cayuga and Seneca canals. (Not reproduced in this report.)

Pamphlet containing the rules and regulations governing navigation on the State canals, together with extracts from the various statutes appertaining to canal navigation. (Not reproduced in this report.)

Pamphlet describing the canal system in general terms and containing interesting facts concerning it. (Not reproduced in this report.)

Pamphlet containing laws relative to the so-called Barge canal and terminal improvements. (Not reproduced in this report.)

The Canal Law which contains the provisions governing the operation, management and navigation of the canal, and which is known as Chapter 13 of the Laws of 1909, can be found in the Session Laws. I have no copies in separate form which could be sent you. (Not reproduced in this report.)

Supplementing the data contained in the pamphlets above referred to, I beg to give you the following:

AS TO NAVIGATION CHARTS.

As you will note from an examination of these maps, the canal channel lying in canalized lakes and rivers is plainly marked. The markers consist of buoys located at frequent intervals along both sides of the channel, which buoys are lighted at night, the type of lights used being of an intermittent nature to distinguish the same from lights on the shore. Where necessary, beacon and range lights are in place besides elaborate lighthouses on the larger lakes. The total of channel lights installed for the protection and guidance of navigation at the present time is 1,700, and experts have expressed the opinion that the buoy system on the canals of New York State is the most nearly perfect of its kind in the United States.

Various types of buoy lights have been utilized, consisting of electric buoys, acetylene gas buoys, Pintsh gas buoys, and oil-burning buoys.

The care and maintenance of the buoy lighting system is a separate branch of the service. Thirty-one areas have been constituted, each in charge of a single employee whose duty it is to patrol his section daily and keep in perfect condition each light stationed on his area. Such patrol is made in a motor boat provided by the State for that purpose.

It will thus be seen that the State has neglected no detail in supervising and maintaining a system of channel markers by day and lights by night, which permits the safe and convenient navigation of the channel during twenty-four hours of the day.

DIMENSIONS OF CHANNEL.

The so-called Barge Canal Act, being Chapter 147 of the Laws of 1903, as amended, provides that the minimum bottom width of channel in canalized rivers and lakes shall be 200 feet; through rock cuts 94 feet, and through land cuts 75 feet, with considerable additional width at the surface of the water. It also pro-

vides that the minimum depth of the channel throughout shall be 12 feet. These provisions of law have been strictly complied with, and throughout the entire canal system such depth has been given. To maintain the 12-foot depth the State has an adequate dredging plant constantly busy, to the end that any deposits that might be found therein may be promptly removed.

DIMENSIONS OF LOCK CHAMBERS.

The locks on the new canal system are uniform in size. The chambers of the locks have inside dimensions of 45 feet in width and 310 feet in the clear between the miter sill and the breastwall.

BRIDGES.

No bridge of fixed span has been permitted to be built over the canal channel with less than a clearance of $15\frac{1}{2}$ feet between the lowest point of the bridge and the water when at its highest ordinary navigable stage.

SIZE OF BOATS.

With the dimensions of the lock chambers as the governing factor, it is possible for a craft 300 feet long and slightly less than 45 feet wide, with a draft of 11 feet and upwards, to navigate the canal channel from the Great Lakes to the Hudson river. There is no bend in the canal channel having a curvature in excess of four degrees. The carrying capacity of the boat will depend, of course, on the type of its construction, but, assuming that a craft should be built to take up the full capacity of the lock chambers, and of a draft to enable it to navigate a channel 12 feet deep, it is possible for a boat of the maximum size to carry as much as 2,800 tons.

CANAL OPERATION.

The canal system is maintained under a provision of the Constitution, and the Constitution provides that it shall remain under State management forever, and shall never be leased, sold or otherwise disposed of. It is maintained solely at the expense of the State, and large appropriations are made annually for maintenance, repair and operation. All canals are free of tolls.

The canals with their locks and all other structures are completely manned during the navigation season, and are operated throughout the entire twenty-four hours of the day, Sundays and

holidays included. They are open to navigation as early as climatic conditions will permit, and are not closed until thick ice forms in the waters. During 1921 the canals will be placed at the disposal of commerce on April thirtieth. The usual closing date comes in December.

Any features of canal construction or canal navigation not covered in this letter will be found discussed in the pamphlets which are being sent herewith.

Yours very truly,

(Signed) CHARLES L. CADLE,
Superintendent of Public Works.

STATE OF NEW YORK

**PROGRESS REPORT
NUMBER 2**

OF THE

**Commission in Opposition to the
St. Lawrence Ship Canal
and Power Project**



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1922**

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PROGRESS REPORT NO. 3

OF THE

Commission Created Pursuant to Chapter 806 of the Laws of 1920, and Authorized by Chapter 339 of the Laws of 1921 to Represent the State of New York in Opposition to the St. Lawrence Ship Canal and Power Project

To the Legislature of the State of New York:

Commission created pursuant to Chapter 806 of the Laws of 1920 to represent the State of New York at hearings before the International Joint Commission on Boundary Waters created under and by virtue of Article 9 of the Convention concluded on January 11, 1909, between the United States and the Dominion of Canada and authorized by Chapter 339 of the Laws of 1921 to collate such data and present such facts and arguments to said International Joint Commission as to said Commission created by said first mentioned act as may seem proper in relation to said proposed St. Lawrence Ship Canal and Power Project and also authorized by said last mentioned act to represent the State of New York in conferences with the representatives of the governments of other States of the United States and of the Congress of the United States, their commissions and committees, having under consideration said proposed St. Lawrence Ship Canal and Power Project and matters incidental thereto, submits the following Progress Report No. 3, comprising in part its answer to the recommendations embodied in the report of the International Joint Commission submitted to Congress of the United States by the President on January 16, 1922, and also embodying several papers and documents in answer to certain parts of said report and in relation to other phases thereof.

NOTWITHSTANDING ADVERSE CONDITIONS INTERNATIONAL JOINT
COMMISSION FAVOR PROJECT

Notwithstanding the lengthy hearings before said International Joint Commission, at which hearings were presented much data, showing the uneconomic features of said proposed St. Lawrence Ship Canal Project and the presentation of transcripts of official

records, showing that under normal conditions not more than one-tenth of the tonnage of the Great Lakes region is destined for export or even for the seacoast and that that is likely to decrease as the consumption of American grains increases with the increasing population in the United States and therefore the prospective tonnage from the Great Lakes region to the sea is likely to decrease rather than to increase and therefore that the demands of such a ship canal down the St. Lawrence will diminish as time goes on, and notwithstanding the fact that it was shown, as this Commission believes conclusively, that ships constructed for ocean service could not profitably navigate the St. Lawrence, Great Lakes and their connecting channels in competition with Great Lakes carriers and notwithstanding the further fact that it was shown that the navigation of the St. Lawrence is attended with many hazards and that it is closed for five months in the year, when the movement of grains from the west reaches the maximum amount and therefore are by climatic and other natural conditions prevailing in Canada forced into transportation routes through the United States to the sea and notwithstanding the many obstacles to the construction of such a waterway, which neither industry nor art can without great expense only partially overcome and notwithstanding the enormous cost of the proposed project and notwithstanding the fact that it was conclusively shown that the State of New York had provided a great waterway system between the Great Lakes and the sea, capacious enough to transport all the tonnage of the Great Lakes region destined for the seaboard and that there is little or no tonnage to be shipped from the seacoast to the Great Lakes region and notwithstanding that many other indisputable facts were presented to the International Joint Commission at their several hearings, still that Commission finally reported and recommended as follows:

“(1) That the governments of the United States and Canada enter into an agreement by way of treaty for a scheme of improvement of the St. Lawrence river between Montreal and Lake Ontario.

“(2) That the new Welland Ship canal be embodied in said scheme and treated as a part thereof.

“(3) That the proposed works between Montreal and Lake Ontario be based upon the report of the engineering board accompanying this report, but that before any final

decision is reached the report of the board, together with such comments, criticisms, and alternative plans as have been filed with the Commission be referred back to the board enlarged by other leading members of the engineering profession, to the end that the whole question be given that further and complete study that its magnitude and importance demand, and that after completion the administrative features of the improvement be carried out as set forth in recommendations 7 and 8 hereof.

“(4) That there shall be an exhaustive investigation of the extent and character of the damage through flowage involved in the plan of development finally adopted.

“(5) That, assuming the adoption of the plans of the engineering board, or of other plans also involving a readjustment of the international boundary, in order to bring each of the power houses on its own side of the boundary, appropriate steps be taken to transfer to one country or the other, as the case may be, the slight acreage of submerged land involved.

“(6) That Canada proceed with the works necessary for the completion of said New Welland Ship Canal in accordance with the plans already decided upon by that country.

“(7) That such ‘navigation works’ as do not lie wholly within one country or are not capable of economic and efficient construction, maintenance, and operation within one country as complete and independent units, be maintained and operated by a board hereinafter called the international board, on which each country shall have equal representation.

“(8) That such ‘navigation works’ as lie wholly within one country and are capable of economic and efficient construction, maintenance, and operation by the country in which they are located with the right of inspection by the said international board to insure economy and efficiency.

“(9) That ‘power works’ be built, installed, and operated by and at the expense of the country in which they are located.

“(10) That, except as set forth in recommendation (11), the cost of all ‘navigation works’ be apportioned between the two countries on the basis of the benefits each will receive from the new waterway: Provided, That during the period

ending five years after completion of the works — and to be known as the construction period — the ratio fixing the amount chargeable to each country shall be determined upon certain known factors, such as the developed resources and foreign and coastwise trade of each country within the territory economically tributary to the proposed waterway, and that that ratio shall be adjusted every five years thereafter and based upon the freight tonnage of each country actually using the waterway during the previous five-year period.

“(11) That the cost of ‘navigation works’ for the combined use of navigation and power over and above the cost of works necessary for navigation alone should be apportioned equally between the two countries.”

In subdivision (3) of such recommendations the International Joint Commission state that “before any final decision is reached the report of the board, together with such comments, criticisms, and alternative plans as have been filed with the commission be referred back to the board enlarged by other leading members of the engineering profession, to the end that the whole question be given that further and complete study that its magnitude and importance demand, and that after completion the administrative features of the improvement be carried out as set forth in recommendations 7 and 8 hereof.”

COMMENTS, CRITICISMS AND ALTERNATIVE PLANS

It thus appears that the obstacles, which were pointed out at the Ottawa and other hearings, to the construction of the St. Lawrence Ship Canal and Power Project are so many and so difficult to overcome, that the International Joint Commission did not recommend that the project, outlined in the report of Colonel W. P. Wooten of the Corps of Engineers of the U. S. A. and of W. A. Bowden, Chief Engineer of the Department of Railways and Canals of the Canadian Government should be undertaken without further and complete study by leading members of the engineering profession, who are expected to give consideration to the comments, criticisms and alternative plans that were filed with the International Joint Commission. That may involve reinvestigation of the entire project *de novo* for, as already stated, it was shown by such expert engineers as Colonel Hugh L. Cooper and by men less notable than Colonel Cooper, familiar with various

phases of the subject that the plans outlined by the engineers could not be carried to completion without a much larger expenditure of moneys than were estimated by the engineers and that, if carried to completion, they would not produce the amount of power estimated by said engineers, as would be produced and furthermore that Colonel Cooper and others stated that the structures, if built as proposed by the engineers, might be carried out by the first downflow of ice in the St. Lawrence river.

OBSTACLES POINTED OUT IN APPENDIX "A"

Some of the obstacles are pointed out in the article prepared by Commissioner Henry W. Hill for the magazine known as "Water Resources," which article, with the permission of the publishers of said magazine, is included in this report and is annexed hereto as Appendix "A." That article has been somewhat extended beyond its original scope.

There is contained therein a summary of the physical conditions of the St. Lawrence and a discussion of the proposed structures recommended by the engineers for the improvement of the St. Lawrence River, both for navigation and power purposes. There is also contained in said Appendix "A" a discussion of matters bearing on the uneconomic features of said proposed St. Lawrence Ship Canal and also the items of estimated cost of such proposed improvement, both for navigation and power purposes. The engineers' report does not contain full estimates for damages for flooding lands.

THE ST. LAWRENCE PROJECT A TRANSPORTATION FALLACY SHOWN IN APPENDIX "B"

There is also submitted as a part of this report the article of William H. Chandler, Esq., Manager of the Transportation Department of the Boston Chamber of Commerce dealing primarily with the St. Lawrence project from the transportation standpoint and discussing particularly the attitude of New England in relation thereto. Mr. Chandler has had extensive practical experience and possesses practical knowledge of transportation by rail as well as by water and his contribution to the discussion is of such importance that it is included in this report and is annexed hereto as Appendix "B." It is entitled "The St. Lawrence Project, a Transportation Fallacy."

ITS ALLEGED ECONOMIC ASPECTS REFUTED HEREIN AND IN
APPENDIX "C"

In the consideration of the economic features of the proposed St. Lawrence Ship Canal and Power Project, much space and consideration were given by the International Joint Commission to the brief or work entitled "Economic Aspects of the Great Lakes-St. Lawrence Ship Canal" by Roy S. MacElwee and Alfred H. Ritter. The Commission quotes quite at length from that work and predicates some of its conclusions thereon. The work, however, has been so generally criticized that we are at loss to understand why the International Joint Commission gave so much consideration to it. A careful analysis of the work will show it to be so fallacious as to destroy its usefulness as a basis for predicating any recommendations whatever upon it for governmental action. For instance, in one paragraph quoted the astounding statement is made that "The present commerce of the Great Lakes furnishes no basis for estimating the commerce of the Great Lakes-St. Lawrence Waterway." That in itself shows the lack of judicial consideration given to the matters discussed in said work. That was one of the matters submitted to the International Joint Commission for its consideration and still the authors of that book assume to advise the International Joint Commission to disregard that instruction. Much evidence from official sources was introduced to show the present tonnage of the Great Lakes and that such tonnage was not likely to increase but rather to decrease as the population of the United States increases and consumes more largely its cereal products. The transportation of the surplus of such cereal products is assigned as the principal argument for the St. Lawrence Ship Canal.

In further answer to the MacElwee-Ritter report we will insert in the record a paper prepared by George Clinton, Jr. of Buffalo, and read before the New York State Waterways Association at its convention in Albany, October 28, 1921, which forms Appendix "C" to this report. It is entitled "Some Fallacies of the MacElwee-Ritter Book on the 'Economic Aspects of the Great Lakes-St. Lawrence Ship Canal.'" While that paper is not exhaustive, it is long enough to disclose some of the fallacies of that book, upon which the International Joint Commission have, in part, predicated its conclusions. A further analysis might be made of that book, which would entirely destroy its value as a reference work.

To offset the argument that ocean-going vessels would have no considerable cargoes to transport from European or Atlantic ports to the Great Lakes, the authors of "Economic Aspects of the Great Lakes-St. Lawrence Ship Canal," at page 239, institute a comparison between the imports and exports at certain Atlantic ports for the years 1918 and 1919, and thereby attempt to establish their assertion that there is a lack of equilibrium of tonnage of inbound and outbound cargoes of vessels engaged in foreign commerce with the United States. The point is that they limit the comparison to those two years following the war when the importation of European products was abnormally small.

COMMERCE AT ATLANTIC, GULF AND PACIFIC PORTS IN 1920, WITH INCOMING AND OUTGOING TONNAGE APPROACHING AN EQUILIBRIUM

We give the commerce of some of the principal ports for the year 1920, in further answer to the statements in the MacElwee-Ritter report.

At Portland in the year 1920 the foreign imports were 356,647 tons, while the exports were 598,685 tons, and the domestic coastwise incoming and outgoing tonnage was 1,505,905 tons, making a total waterborne commerce at Portland for the year 1920 of 2,461,237 tons. These official statistics show that there was a fair equilibrium of incoming and outgoing cargoes for that year.

The foreign imports at the Port of Boston for the year 1920 were 1,106,981 tons, and the foreign exports for the same year were 553,749 tons, and the domestic coastwise commerce, incoming and outgoing was 4,629,659 tons, as appears from the annual report of the Chief of Engineers for the year 1921, page 121. It will be noted that the foreign imports at the Port of Boston for the year 1920 were nearly twice the amount of the exports.

The foreign tonnage at the Port of New York for the year 1920 was 22,441,521 tons, and the coastwise tonnage at the Port of New York for the same period is given as 4,506,822 tons, which is only a part of the domestic tonnage of the Port of New York. Such foreign and coastwise tonnage is merely that passing through the entrance channels and may not include the commerce passing through other channels into other parts of the New York harbor, but from such records as are available it appears that the incoming and outgoing tonnage at the Port of New York is in a state of equilibrium.

The foreign imports up the Delaware River, Philadelphia, for the year 1920 aggregated 3,808,768 tons, and the foreign exports for the same period aggregated 7,575,008 tons, and the domestic coastwise receipts amounted to 2,124,666 tons, and the domestic coastwise shipments for the same period amount to 2,161,122 tons, making the entire waterborne tonnage at Philadelphia, 15,669,564 tons for the entire tonnage on the Delaware River for the year 1920 amount to 23,947,248 tons.

The foreign imports at Baltimore for the year 1920 amounted to 3,202,030 tons, and the foreign exports for the same period amounted to 6,667,211 tons, and the domestic coastwise receipts amounted to 541,691 tons, and the domestic coastwise shipments amounted to 526,212 tons. The domestic receipts and domestic shipments at Baltimore in 1920 were nearly equal.

The foreign imports at Norfolk for the year 1920 amounted to 331,411 tons and the foreign exports for the same period aggregated 7,472,992 tons and the domestic coastwise receipts for the year 1920 amounted to 794,674 tons and the domestic coastwise shipments for the year 1920 at Norfolk aggregated 6,323,616 tons. Norfolk is one of the largest Atlantic export ports for the shipment of bituminous coal, which makes up the bulk of its domestic export tonnage.

The foreign imports at the Port of Mobile for the year 1920 amounted to 361,455 tons and the exports for that year amounted to 774,062 tons and the domestic coastwise receipts amounted to 402,771 tons and the domestic coastwise shipments amounted to 116,927 tons, making the entire water-borne tonnage at the port of Mobile 1,655,215 tons.

The foreign imports at the Port of New Orleans for the year 1920 aggregated 4,322,654 tons and the foreign exports for the same period amounted to 4,994,599 tons, showing that they were almost in state of equilibrium. The coastwise domestic imports at that port for the year 1920 amounted to 322,560 tons and the exports amounted to 874,050 tons.

The foreign imports at the Port of Galveston for the year 1920 were 2,135,260 tons and the foreign exports for the same year amounted to 2,596,167½ tons and the domestic tonnage for the same year, incoming and outgoing, amounted to 2,782,922 tons.

The foreign imports at the Port of Los Angeles for the year 1920 amounted to 106,215 tons, whereas the exports for the same

period amounted to 646,298 tons, or about $6\frac{1}{2}$ times and not 20 times the imports as stated in the book above referred to for the year 1918, and the domestic coastwise receipts amounted to 1,552,333 tons and the domestic coastwise shipments amounted to 2,035,228 tons.

The waterborne tonnage on ocean vessels in the Second District of Portland, Oregon, for the year 1920 aggregated 2,916,039 tons and the waterborne tonnage on river vessels for the same period in that district amounted to 1,566,247 tons, making a total tonnage of 4,482,286 tons. The exports of foreign tonnage were 906,187 tons, while the imports were only 46,705 tons. That is due to the large export commerce out of the Port of Portland and exceptional conditions obtained in that port which do not exist in any of the Atlantic ports.

It will thus be seen that there is an approach to an equilibrium of the tonnage of inbound and outbound vessels engaged in commerce between the United States and European and other foreign nations.

The tides of commerce flow through such ports as Portland, Boston, New York, Philadelphia, Wilmington, Baltimore, Norfolk, and Newport News, Charleston, Savannah, Jacksonville, Pensacola, Mobile, New Orleans and Galveston, to and from the interior, and they, after a century of concerted effort, have become great distributing centers for the entire Atlantic and Gulf States as well as for the interior States in water communication with such ports. As the world's commerce expands southerly, all such southern Atlantic and Gulf ports will become still greater distributing centers. Such ports as Los Angeles, San Francisco, Seattle and Portland on the Pacific are likewise distributing centers for the entire western portion of the United States. Much time and concentrated effort are required to build up the commerce of such Atlantic, Gulf and Pacific ports as those mentioned. The commerce of such ports is conditioned not only on the physical characteristics of the ports themselves and connecting routes of transportation, but also upon the organization of commercial activities and the radiation of routes of trade and transportation to and from such ports, which altogether co-operate to increase that commerce. This is well illustrated in the case of the world-wide commerce of London, Liverpool, Hamburg, New York, Philadelphia, Boston, Wilmington, Baltimore, New Orleans and

San Francisco. Such other ports as Portland (Maine), Norfolk, Newport News, Charleston, Savannah, Jacksonville, Pensacola, Mobile, Galveston, Los Angeles, Seattle and Portland (Oregon), are forging ahead and reaching out for world-wide commerce and because they are advantageously situated as distributing centers for the territories in touch with them and they will become great emporiums of trade as time goes on.

All these oceanic ports possess natural advantages over Great Lakes ports that neither art nor industry on the part of Lake ports can overcome. Such oceanic ports are so geographically distributed as to afford access to the ocean from the interior of a large part of the country and to serve its commercial needs and it is not at all likely that the Lake ports can overcome the natural and physical advantages for commercial purposes, which such oceanic ports possess.

The chief of U. S. Engineers in his report for 1921, volume 2, at page 52, said "that the coastwise receipts of 45,371,489 tons and shipments of 49,153,031 tons do not balance and that is probably due in great measure to the fact that there is more or less overlapping in the tables showing the commerce at ports and the commerce on rivers, canals and connecting channels. A shipment from a port may have its destination on a river, and vice versa, so that in practice the coastwise receipts and shipments will not agree. * * * After eliminating all known duplications, the total domestic tonnage at the Atlantic, Gulf and Pacific ports in 1920 was 214,941,447 tons."

That report also shows that the total imports of foreign commerce for the year 1920 at the Atlantic, Gulf and Pacific ports was 36,580,773 tons, and the exports of foreign commerce from those ports for that year were 63,803,433 tons. That report also shows that the total foreign imports for the year 1920, at all of the Great Lakes ports were 3,323,210 tons, and the total foreign exports for that year were 9,065,497 tons, and that the domestic receipts at such ports for the year 1920 were 98,292,574 tons, and the total domestic shipments of such ports for that year were 98,448,063 tons and practically balanced.

Eliminating all known duplications, the total tonnage over the rivers, canals and connecting channels of the United States for the year 1920 was 48,187,893 tons.

LITTLE FOREIGN TONNAGE TO GREAT LAKES PORTS — CARRYING CAPACITY OF GREAT LAKES AND OCEAN VESSELS

This analysis of the waterborne commerce of the United States might be extended to show that incoming and outgoing tonnage of nearly all the ocean, Great Lakes and interior river ports of the United States, separately or those in easy communication, approaches an equilibrium and so afford cargoes for incoming and outgoing vessels at those ports. That is not true, however, of foreign tonnage to the Great Lakes ports, to which little European or other oceanic tonnage is destined. No such tonnage in cargo quantities reaches any one of the Great Lakes ports and ocean going vessels can not profitably steam from the Gulf of St. Lawrence up the long tortuous St. Lawrence channels against the stiff currents and up through the Great Lakes and their connecting channels and up through 16 or more locks, causing long delays in their passage to Lake Superior ports, 600 feet above the sea level and 2,250 miles from the Gulf of St. Lawrence, without the earnings on up-lake cargoes, merely to bring down grains or other tonnage, and especially so when such ocean vessels have much less carrying capacity than Great Lakes' carriers have on account of the dead weight of such ocean vessels, which use up much of their "floating power" or loaded displacement, whereas the dead weight of Great Lakes' carriers is much less in proportion to their "floating power" or loaded displacement and therefore their cargo carrying capacity is much greater in proportion to their "floating power" or loaded displacement. Accordingly, on a 20, 25 or 30 feet draft, a Great Lakes' vessel will carry a much heavier cargo than an ocean vessel of like draft and like loaded displacement. Great Lakes' vessels can transport heavier cargoes than can ocean vessels of similar dimensions and therefore the former can carry tonnage cheaper per ton mile, so that ocean vessels cannot compete in the transportation service with the Great Lakes' carriers specially designed for such service.

Some large Great Lakes' carriers with a draft of 19½ feet transport fourteen thousand tons of freight, whereas an ocean vessel of like draft and of other like dimensions would not be able to carry any such amount of freight. The result would be that the larger cargo carriers will drive out of the service the smaller carriers as they have done in the Great Lakes and on the ocean.

From long and varied trials, it has been found that neither ocean-going nor other types of vessels can successfully compete in transportation on the Great Lakes with the vessels specially designed for that service.

OCEAN AND GREAT LAKES VESSELS DIFFER RADICALLY IN CONSTRUCTION

The late Colonel Thomas W. Symons of the Corps of Engineers of the United States, in 1897 submitted his report on the proposed ship canal from the Great Lakes to the Hudson river to the Chief of Engineers, and by him through Hon. R. A. Alger, Secretary of War, that report was submitted to Congress as House Document No. 86 of the first session of the 55th Congress. In that report, at page 46, Colonel Symons said: "The pleasing picture of great ships loading grain, flour and produce of all kinds at Chicago, Duluth, etc., and proceeding thence to transatlantic ports, and arriving at these lake ports with foreign cargoes, I cannot believe will ever be realized to any great extent even if a ship canal connecting the Great Lakes with tidewater should be built." At page 49 of that report Colonel Symons said: "Ocean vessels fitted for combating the storms of the North Atlantic are built much heavier, stronger, deeper and on finer lines than are the lake ships. The machinery differs radically, owing to the salt water, and is more expensive and differently placed. In the ocean ships surface condensers are imperative and much brass or lead piping is required. The machinery placed amidships, interfere with rapid loading and unloading. The hatches are too small and too few and not properly spaced to suit docks, elevators, etc., and the rapid handling of freight in lake ports. The coal bunkers are too large, occupying valuable room. All dock constructions, the rudders, anchors, chains, etc., are heavier and more expensive than are required for the lakes. The decks add weight and interfere with loading, storing and unloading coarse freight. Speaking comparatively, the bottoms of ocean vessels are made for floating and the bottoms of lake vessels are designed for grounding."

Ocean vessels have moulded bottoms, terminating in keels, whereas lake vessels have flat bottoms and that enables the latter to carry heavier cargoes than ocean vessels of similar draft. There are many other differences in the types of ocean and lake vessels which have been found necessary for practical ocean and lake transportation service. All attempts heretofore made to unify

that service in vessels of a single type have failed. Ocean and lake transportation must be carried on under entirely different physical conditions and therefore different types of vessels are required for that service. All vessel owners understand that and govern themselves accordingly.

CAPTAIN WILLIAMS CHARACTERIZES THE ST. LAWRENCE PROJECT
AS "IMPRACTICABLE"

In further answer to the proponents of the St. Lawrence project, we excerpt from a published report of a communication from Captain F. D. Williams of Kingston, Canada, to Premier Taschereau of the Province of Quebec. Captain Williams, who has had 30 years experience in navigating the St. Lawrence and its 14 foot canals between Kingston and Montreal is reported as characterizing the St. Lawrence project as "impracticable and absurd." He is reported writing to Premier Taschereau, that "the present class of vessels navigating these waters to Montreal are the largest that ever will do so, and it is only with the most careful management and with the utmost caution and best of pilots that these vessels with a 14-foot draft are able to get through, and during each season many come to grief as it is. The very idea of any person thinking that an ocean-going steamer could proceed west of Montreal is too absurd for any one knowing the situation to entertain for a moment," in Captain Williams' opinion. "One of our fastest boats takes 25 days to make the trip from Montreal to Port Arthur and return, and that means running all the time without delays of any kind whatever, and allowing one day for unloading and one day for loading. The usual time for these boats is 30 days to make the round trip, so that even were it possible, how much longer would it take an ocean liner, which would have to proceed so much slower through the canals and in dangerous places?

"The whole river between Kingston and Montreal would have to be blasted and dredged out, islands removed, every harbor on the lakes deepened and many other obstacles too numerous to mention would have to be overcome. Any competent steamboat captain like myself knows the scheme is impossible, and what is the use of losing time over such a foolhardy project which billions of dollars could not complete?"

THE SHIPPING FEDERATION OF CANADA STRONGLY OPPOSES THE ST. LAWRENCE PROJECT IN APPENDICES "D" AND "E"

The impracticability and inadvisability of the St. Lawrence Ship Canal and Power project was likewise presented to the International Joint Commission on Boundary Waters by the Shipping Federation of Canada in a memorandum, a copy of which, in view of the further consideration of the project by the Congress of the United States and by Parliament of the Dominion of Canada, and by the people of both nations, is worthy of serious consideration, and it is submitted herewith and annexed hereto as Appendix "D."

That memorandum contains eight appendices numbered from 1 to 8 inclusive, which will not be confused with the appendices of this Progress Report No. 3, which latter appendices are lettered "A," "B," "C," "D," "E," "F," "G," "H," "I," "J," etc.

After the Engineers had made their report on the engineering features of and problems involved in the St. Lawrence project, the Shipping Federation of Canada submitted another memorandum to the International Joint Commission, a copy of which is submitted herewith and annexed hereto as Appendix "E."

WIDESPREAD OPPOSITION TO THE ST. LAWRENCE PROJECT WILL BE FOUND IN APPENDIX "F"

The project is so stupendous and has aroused such general discussion in both the United States and in Canada that we have concluded to submit herewith resolutions, opinions and other data collated from various sources and a few excerpts of the many interviews, which W. R. Meldrum of the Buffalo Evening News had with some representative citizens of both the United States and Canada on the St. Lawrence Ship Canal and Power project, and include such material in Appendix "F" hereto annexed.

GENERAL GOETHALS PRONOUNCES THE ST. LAWRENCE PROJECT IMPRACTICABLE AS A SEABOARD PROJECT

The data and expert opinions collated in Appendix "F" are reinforced by the expert opinion of General George W. Goethals, who completed the Panama canal and who is reported to have declared in an interview at St. Paul, on January 31, 1922, that the proposed St. Lawrence-Great Lakes tide water project "was impractical as seaboard project. * * * The idea that New

York is opposed to the project for selfish motives is all bosh. Every new transportation system only helps every other transportation system and if I believed the St. Lawrence plan practical, I should approve it."

He continued: "I have not seen the report on this project, however, although I have written for one. In the first place, the Great Lakes seaboard project is visionary. There is no enough water to carry ocean-going boats to the head of the Great Lakes and the expense of deepening the lakes would be prohibitive to say nothing of the river improvements. There is a difference between boats that operate on the Great Lakes and the boats that go to sea, and it would be impractical and prohibitive in expense to attempt to bring the ocean-going steamers through the Great Lakes. The two kinds of transportation are different and require different kinds of equipment."

THE MERCHANTS ASSOCIATION OF NEW YORK INSISTS ON
FURTHER INVESTIGATION BEFORE EMBARKING UPON THE
UNDERTAKING INVOLVING SUCH AN IMMENSE NATIONAL
OUTLAY

The Merchants' Association of New York in its memorial to the Committee on Interstate and Foreign Commerce of the House of Representatives in relation to the improvement of the Great Lakes-St. Lawrence Waterway, among other things, declared that "when a project of enormous cost, the expense of which is to be borne by the nation as a whole, is proposed, it is fitting and proper that it should be thoroughly studied by the people in order to determine whether or not the benefits alleged are actual or only imaginary. No reasonable-minded person will seriously contend that in the present financial stress of this nation a huge wasteful outlay would be justified, nor that under any circumstances would such outlay be justifiable should it appear that Canada and not the United States would be the beneficiary, and that such result would be reached by inflicting severe injury upon the Atlantic and Gulf ports of the United States without adequate and compensating benefit to the interior portions of the country.

"This undertaking involves an immense National outlay. It can be justified only if it be incontrovertibly demonstrated that it will result in a National benefit. Its advocates contend that it will greatly benefit American agricultural interests by lessening the cost of grain transportation. This is open to grave question. The export of grain from the United States is steadily diminish-

ing. Year by year the grain production of the country is to a greater degree required for home consumption. In the opinion of many well-qualified judges, the export of grain by the United States will, within a few years, have practically ceased, and so far as the export of grain produced in the United States is concerned, the St. Lawrence waterway will have ceased to have value."

LEADING JOURNALS AND PROMINENT CITIZENS IN SEVERAL
CANADIAN PROVINCES STRONGLY OPPOSED TO THE ST. LAW-
RENCE PROJECT AS A JOINT UNDERTAKING AND TO ITS COST

The leading journals and prominent citizens in several Canadian Provinces assert that the project will be of no economic value to Canada with its enormous investments in its transcontinental railways and its heavy war burdens. Many Canadians object to scrapping their 14-foot St. Lawrence canals which have cost \$75,000,000, in addition to \$80,000,000, the estimated cost of the Welland canal, and in addition to \$85,000,000, the cost of the Chippewa Power development, and in addition to the millions spent in building the locks and making other improvements in St. Mary's river. They strenuously object to surrendering control of their St. Lawrence canal system and their natural resources in the water powers in the St. Lawrence river and to turning them over to an International Joint Commission to be trafficked in politically or otherwise and placed beyond their national control.

THE WATER POWERS OF THE ST. LAWRENCE ARE THE NATURAL
RESOURCES OF THE PROVINCES OF QUEBEC AND ONTARIO
AND OF THE STATE OF NEW YORK AND PROPERTY RIGHTS,
WHICH CANNOT BE TAKEN WITHOUT COMPENSATION BEING
MADE THEREFOR

The Provinces of Quebec and Ontario have not ceded their rights in the waters of the St. Lawrence, nor in the lands under such waters in aid of navigation to the Dominion Government and they and the proprietors of such riparian rights will undoubtedly assert their claim thereto in the event the Dominion Government undertake to deprive such provinces and the riparian owners therein of their riparian property rights. Certainly the State of New York will not voluntarily surrender to the United States without contest its sovereign control of and proprietary or other rights in and to the lands under the waters of the St. Lawrence south of the International Boundary Line, as well as in and

to the water powers themselves on the plea of the proponents of the St. Lawrence project that the entire voluminous flow of 241 thousand cubic feet per second of the St. Lawrence river is necessary to feed a canal in Canada to be navigated by vessels of 25 or 30 feet draft, when only an inappreciable amount of water is now used to feed Canadian canals of 14 feet depth. That plea is so supposititious, that it is hardly conceivable that the United States government will suffer itself to be induced to undertake to deprive the State of New York and its proprietary owners of their vested rights in the St. Lawrence river, any more than it would suffer itself to be induced to undertake to deprive unlawfully the states of Pennsylvania and West Virginia of their coal mines or the state of Michigan of its copper deposits.

The water powers of the St. Lawrence south of the International boundary line are some of the natural resources of the state, quite as much as are the coal deposits and other minerals the natural resources of other states.

Such water rights have been recognized as property rights from the time of the Magna Charta, and under the decisions of the U. S. Supreme Court, as well as under the moral law, they belong to the State of New York, subject only to the right of the Federal government to interfere with their enjoyment so far as it may be necessary under the commerce clause of the Constitution to take them in aid of navigation.

THE ST. LAWRENCE PROJECT BELIEVED TO BE PRIMARILY A
SCHEME TO DEVELOP POWER—AS TO FEDERAL AND STATE
WATER POWER LAWS, SEE APPENDIX "G"

Under the plans of the International Joint Commission for the construction of a side canal opposite the Long Sault rapids, it cannot be successfully maintained that all such waters are necessary to aid navigation. It must be apparent to all that the project is primarily a scheme to develop power, which the United States has no constitutional authority to do. In this connection it may be well to consider the recently enacted Federal Water Power and New York State Water Power laws and the extent of national and state sovereign control of such boundary waters as the St. Lawrence river. Fortunately we are able to submit herewith the Paper on Federal and State Power Laws prepared by Honorable George Clinton of Buffalo, for the twelfth annual convention of the New York State Waterways Association, held in Albany, on

October 27 and 28, 1921. That discusses the subject so thoroughly and so exhaustively that, as was said of some of the arguments of William Pinkney before the Supreme Court of the United States, has the force of judicial opinion.

It is a most timely contribution to the important constitutional questions involved in the St. Lawrence Ship Canal and Power Project as well as those involved in the disposition of other water power problems. It is annexed hereto as Appendix "G."

The report of the International Joint Commission is entitled "St. Lawrence Waterway" and is Senate Document No. 114 of the Second Session of the 67th Congress. Without its appendices, it is a document of 184 pages with several maps illustrative of the plans submitted by the engineers of the Commission and by the Hydro-Electric Power Commission of Ontario, and other maps showing the density of population, water powers within 300 miles of the Long Sault, and primary powers in the manufacturing centers of New York and New England.

It is apparent from the report that the attention of the Commission was centered upon the project as a scheme to develop power quite as much as one to promote commerce. It has even been asserted that the development of power was the primary purpose of the project and that accounts for the activity of the representatives of large power interests at the various hearings before the International Joint Commission, which devoted much time to the Water Power Problem forming Part V of its report. Under the heading "Recommendations," at page 180 of the report of the International Joint Commission, hereinbefore described, the Commission says:

RECOMMENDATIONS OF THE INTERNATIONAL JOINT COMMISSION

In harmony with its conclusions as outlined in the foregoing report the Commission recommends:

(1) That the Governments of the United States and Canada enter into an arrangement by way of treaty for a scheme of improvement of the St. Lawrence River between Montreal and Lake Ontario.

(2) That the New Welland Ship Canal be embodied in said scheme and treated as a part thereof.

(3) That the proposed works between Montreal and Lake Ontario be based upon the report of the engineering board accompanying this report, but that before any final decision is reached

the report of the board, together with such comments, criticisms, and alternative plans as have been filed with the Commission be referred back to the board enlarged by other leading members of the engineering profession, to the end that the whole question be given that further and complete study that its magnitude and importance demand, and that after completion the administrative features of the improvement be carried out as set forth in recommendations 7 and 8 hereof.

(4) That there shall be an exhaustive investigation of the extent and character of the damage through flowage involved in the plan of development finally adopted.

(5) That, assuming the adoption of the plans of the engineering board, or of other plans also involving a readjustment of the international boundary, in order to bring each of the power houses on its own side of the boundary, appropriate steps be taken to transfer to one country or the other, as the case may be, the slight acreage of submerged land involved.

(6) That Canada proceed with the works necessary for the completion of said New Welland Ship Canal in accordance with the plans already decided upon by that country.

(7) That such "navigation works" as do not lie wholly within one country or are not capable of economic and efficient construction, maintenance, and operation within one country as complete and independent units, be maintained and operated by a board hereinafter called the international board, on which each country shall have equal representation.

(8) That such "navigation works" as lie wholly within one country and are capable of economic and efficient construction, maintenance, and operation as complete and independent units be maintained and operated by the country in which they are located with the right of inspection by the said international board to insure economy and efficiency.

(9) That "power works" be built, installed, and operated by and at the expense of the country in which they are located.

(10) That, except as set forth in recommendation (11), the cost of all "navigation works" be apportioned between the two countries on the basis of the benefits each will receive from the new waterway: *Provided*, That during the period ending five years after completion of the works—and to be known as the construction period—the ratio fixing the amount chargeable to each country shall be determined upon certain known factors,

such as the developed resources and foreign and coastwise trade of each country within the territory economically tributary to the proposed waterway, and that that ratio shall be adjusted every five years thereafter and based upon the freight tonnage of each country actually using the waterway during the previous five-year period.

(11) That the cost of "navigation works" for the combined use of navigation and power over and above the cost of works necessary for navigation alone should be apportioned equally between the two countries.

ANSWERS OF THE INTERNATIONAL JOINT COMMISSION TO CERTAIN QUESTIONS

Under the heading "Answers to Questions" at page 181 of the report, the Commission says:

Finally, coming to the specific questions submitted to the commission by the two governments, the commission does not deem it necessary to make any extended answers in view of the conclusions and recommendations set forth in the foregoing pages. The commission answers the several questions as follows:

Question I. What further improvement in the St. Lawrence river, between Montreal and Lake Ontario, is necessary to make the same navigable for deep draft vessels of either the lake or ocean-going type; what draft of water is recommended; and what is the estimated cost?

In answering this question, the commission is requested to consider:

(a) Navigation interests alone, whether by the construction of locks and dams in the river; by side canals with the necessary locks; or by a combination of the two.

(b) The combination of navigation and power interests to obtain the greatest beneficial use of the waters of the river.

Answer. (a) The commission believes that the greatest beneficial use of the waters of the St. Lawrence river between Montreal and Lake Ontario may be obtained by a combination of navigation and power development in the international section and of navigation alone in the national section with power development therein at some future date.

(b) The commission approves of a combination of dams and side canals with locks in the international section, and side canals

with locks in the national section, as recommended by the engineering board.

(c) The draft of water recommended is 25 feet in the canals and 30 feet on the sills of the locks.

(d) The estimated cost of the completed work between Montreal and Lake Ontario as recommended by the engineering board is about \$252,000,000. To this must be added the cost of the New Welland Ship Canal in order to ascertain the total expenditure involved.

Question II. Which of the schemes submitted by the government or other engineers is preferred, and why?

Answer. Of the schemes submitted by the engineering board, the one recommended by them is preferred. Plans and suggestions in connection with certain portions of the river were submitted by other engineers, but the only complete schemes before the commission are those of the engineering board. For reasons already advanced the commission recommends a further examination and study of the plans of the engineering board, when due consideration may be given to the studies and extensive report of the Hydro-Electric Power Commission of Ontario, as well as to the other reports presented to the commission.

Question III. Under what general method of procedure and in what general order shall the various physical and administrative features of the improvement be carried out?

Answer. (a) So far as the physical features of the improvement are concerned, the commission believes that the works at and near the Long Sault Rapids, whose completion may be expected to require the greatest amount of time, should be commenced as soon as funds are available; and that all other works, both in the international and national sections of the river, should be commenced in time to insure their completion at approximately the same time as the Long Sault works. This method and order of procedure would at one and the same time secure through deep-water navigation, and make possible the development of power at the earliest practicable date.

(b) In regard to the administrative features of the improvement, the commission has set forth in the foregoing recommendations the method of procedure which in its opinion would most efficiently meet the requirements of the situation.

Question IV. Upon what basis shall the capital cost of the completed improvement be apportioned to each country?

Answer. (a) The capital cost of "navigation works" and of the New Welland Ship Canal to be apportioned between the two countries on the basis of the benefits to be derived by each country from the use of the waterway.

(b) The capital cost of "power works" to be borne by the country in which they are located.

(c) The capital cost of "navigation works" for the combined use of navigation and power over and above the cost of works necessary for navigation alone to be apportioned equally between the two countries.

Question V. Upon what basis shall the costs of operation and maintenance be apportioned to each country?

Answer. The apportionment of costs of operation and maintenance of all works both for the purpose of navigation and also of power to be on the same basis as costs of construction of such works respectively.

Question VI. What method of control is recommended for the operation of the improved waterway to secure its most beneficial use?

Answer. The commission recommends : (a) That such "navigation works" as do not lie wholly within one country or are not capable of economic and efficient operation within one country as complete and independent units, be operated under the direction of the international board as set forth in recommendation No. 7; (b) that all "navigation works" other than those particularly mentioned in (a) be operated by the country in which they are located with the right of inspection by the international board as set forth in recommendation No. 8; (c) that "power works" be operated by the country in which they are located as set forth in recommendation No. 9.

Question VII. Will regulating Lake Ontario increase the low water flow in the St. Lawrence Ship Channel below Montreal? And if so, to what extent and at what additional cost?

Answer. The commission is of the opinion that regulating Lake Ontario will increase the low water flow in the St. Lawrence Ship Channel below Montreal; but the extent of the increase can only be determined after practical experience has indicated the best scheme of regulation to adopt. This increase in the low water flow will be secured by the works provided in connection with the improvement of the upper St. Lawrence, and consequently at no additional cost.

Question VIII. To what extent will the improvement develop the resources, commerce, and industry of each country?

Answer. The commission has brought together a very considerable volume of data relating to the resources, commerce, and industry of the area that it is believed would be economically tributary to the proposed deep waterway, and has based certain conclusions upon that data, which are embodied in this report. It is impossible to state in more specific terms the extent to which the improvement would develop the resources, commerce, and industry of each country.

Question IX. What traffic, both incoming and outgoing, in kind and quantity, is likely to be carried upon the proposed route both at its inception and in the future, consideration to be given not only to present conditions, but to probable changes therein resulting from the development of industrial activities due to availability of large quantities of hydraulic power?

Answer. To this question also it is impossible to give a specific answer, in the absence of definite information as to all the factors that will enter into the problem. The commission has brought together authoritative information as to the existing traffic between the tributary area and overseas points as well as between the same area and coastwise points on this continent, and has reached the general conclusion that sufficient traffic will seek the new water route, irrespective of new traffic created as the result of the opening of that route, to justify its construction. The commission has so much confidence in the virility and resourcefulness of the people of these two countries that it is convinced the traffic available for the new waterway will rapidly increase with the further development of the area tributary thereto, and that the creation of new hydraulic power in connection with the waterway will stimulate industrial growth both in manufactures and transportation.

Signed at Washington, this 19th day of December, 1921.

O. GARDNER.
C. A. MAGRATH.
C. D. CLARK.
H. A. POWELL.
M. A. SMITH.
W. H. HEARST.

THE COMMENTS OF A CANADIAN ON THE REPORT OF THE INTERNATIONAL JOINT COMMISSION

In commenting upon some of such recommendations, a person under the nom de plume, "Canadian," in the *Montreal Gazette* of March 9, 1922, says:

"International dealings call for clean-cut definition of rights and obligations, and absolute clarity of statement with regard to points even potentially controversial. Amicable relations rest on a secure basis only when grounded upon perfect mutual understanding.

Judged by this criterion, the report of the commission is a lamentable failure as a foundation upon which to base an international treaty involving momentous issues. Its recommendations as to apportionment of cost of the undertaking, and as to maintenance and operation of the works, if adopted, must prove a fertile source of future misunderstandings.

Recommendation 10 reads:—

"That, except as set forth in recommendation 11, the cost of all 'navigation works' be apportioned between the two countries on the basis of the benefits each will receive from the new waterway; Provided, That during the period ending five years after completion of the works the ratio fixing the amount chargeable to each country shall be determined upon certain known factors, such as the developed resources and foreign coastwise trade of each country within the territory economically tributary to the proposed waterway, and that that ratio shall be adjusted every five years thereafter and based upon the freight tonnage of each country actually using the waterway during the previous five-year period."

Recommendation 11 refers to power cost at the Long Sault only, and has no bearing on the general question.

Could any more vague and indefinite scheme possibly be devised? The cost is to be apportioned on the basis of benefits which cannot be finally determined in the next fifty years. Meantime our liability under the treaty remains an unknown quantity, the "X" in an equation the solution of which is to be a matter of international debate for half a century to come.

True the commission offer a feeble and ineffective method of working out the problem by a series of adjustments every five years of the ratio to be paid by each country. For the first five

years after completion, they say, the ratio is to be determined "upon certain known factors," etc.

Here we have not only an indefinite statement, but a whole bundle of contentious questions rolled up together with troublesome points sticking out all round like the quills on a porcupine. Are the indicated factors all the factors? How and by whom are their bearing and relative importance to be fixed and converted into terms of dollars and cents to be paid by Canada?

After the first five years of operation the commission proposes to cut the Gordian knot by basing the ratio "upon the freight tonnage of each country actually using the waterway during the previous five year period."

This solution entirely ignores the fact that Canada already has a St. Lawrence waterway carrying a large tonnage, and which could easily accommodate double or treble the present traffic without a dollar of capital expenditure. This alone renders the proposition absolutely unfair to Canada. And although at first sight the proposal appears at least to offer a tangible basis of division of costs, nothing could be more highly deceptive. It not only plunges us in a bog of uncertainty, but actually provides for keeping us there as long as the proposed treaty shall last.

Several things may happen. Assume, for example, that proponents of the project are right, and that the 43,000,000 people of the Western States who, the commission tell us, are "fully equipped in every way to take full advantage of the waterway" direct a heavy traffic through it. What will Canada gain? Ninetenths of the lake freighters are American. This great fleet will then come down the St. Lawrence to an American seaport sixty miles above Montreal. There they will meet ocean vessels of the United States mercantile marine which President Harding proposes to subsidize to the tune of \$30,000,000 a year. Not one ton of this traffic can be handled by Canadian carriers, nor will it produce a cent of revenue to the Dominion. Worse even than that. With the enormous advantage given them on the Great Lakes end by the coasting laws and their predominance of tonnage and trade, and at the ocean end by heavily subsidized shipping, which will enjoy the free use of our costly ship channel below Montreal, they will be in a position to take away from Canadian ports the handling even of our own Northwest grain, which only the coasting laws hold now for our own carriers.

Under those conditions, of course, the United States would bear most of the cost of the canals. And, naturally, what they

pay for they will own and control, although nine-tenths of the works are on Canadian soil. We will thus get off cheap, but we will have sacrificed our national commerce, transportation interests and control of the St. Lawrence, and to a great extent our national independence. It would be simpler and lead to the same end in the long run to adopt Senator King's suggestion and at once hand over part of Quebec to the United States and let them assume the entire undertaking.

On the other hand, the prophets may be wrong. United States traffic through the St. Lawrence canals has for years been a mere bagatelle. Last year large quantities of American corn and wheat were forced to the St. Lawrence route by a combination of circumstances which might not occur again in a lifetime. And even last year practically none of the Canadian new crop grain shipped from Fort William came to Montreal. In normal years, 60 per cent of the Canadian wheat goes out via Buffalo.

New York will not lose her trade without a struggle. Railway difficulties, largely a war heritage, which are now the chief cause of the anxiety of the Western States for the waterway, will find a solution. Lower rates on United States railroads—and it should not be forgotten that the New York Central has carried millions of bushels of grain at a rate of $2\frac{1}{2}$ mills per ton per mile—further development of the Erie Canal, or even a 25-foot competing waterway across New York State, might easily in a few years drain the St. Lawrence of American traffic. Herbert Hoover says that in ten years they will have no grain for export. Then we would pay the entire cost.

These are the extremes. But who will undertake to say how far either of them is from the truth? We have already made one bad guess on the St. Lawrence. Our canals were deepened to 14 feet to capture American trade. They were a dismal failure in that respect.

Apply the proposal of the Commission to ordinary business and its absurdity is clear.

"A" is a dry goods man on St. Catherine Street. He owns a lot on which he has a store. His neighbor "B," who is his competitor in the same line, but who has ten times the capital and holds "A's" promissory notes for large amounts, says to him: "Let's tear down your old store and build a million dollar block on your lot. We will both do business in it. If I beat you out and get the trade I'll pay for the building. If not, you'll pay for it." "A" might well say, "Where would I get the million

dollars?"—but he probably would use more vigorous Anglo-Saxon.

On the subject of maintenance and operation it will suffice to say that under the recommendations of the report three distinct jurisdictions are to be established:

1. The United States Government to maintain and operate locks on American soil;
2. The Canadian Government to do the same in Canadian territory, and
3. The "International Board" to maintain works of an international character.

Under the latter heading would fall only the works at the Long Sault. It so happens that only one lock is proposed to be located in United States territory. That is the little joker. Canada is to maintain and operate all the rest of the system, and that one lock puts the United States in virtual control of the whole route.

It is to laugh.

Montreal, March 3, 1922.

CANADIAN."

CANADIANS FEAR INTERNATIONAL COMPLICATIONS

Canadians from Nova Scotia to British Columbia are awakening to a realization of the serious international, national and commercial problems involved in the joint construction, operation and control of the St. Lawrence waterway, nine-tenths of which is wholly within the Dominion of Canada.

In the proposed joint undertaking they see difficulties and chances for serious differences of opinion between the two nations and possible international complications that are grounds for opposition thereto. Now that the report is before the Dominion Parliament they are studying its contents and recommendations. Apparently the more they do so the less they are inclined to favor it. Such provinces as Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Manitoba, Saskatchewan, Alberta and British Columbia, with their rivers and harbors and ocean commerce and with their enormous undeveloped water powers, wholly within provincial control, are not interested in the St. Lawrence development, which will place under joint control of the two nations and beyond sole provincial and beyond Dominion control the water powers of the St. Lawrence, which are the natural resources of Ontario and Quebec, merely to promote a navigation scheme

that will be of no commercial value whatever to those eight provinces, even though it were of some economic value to Ontario, which is by no means conceded.

SOME MAJOR PROBLEMS UNSOLVED BY THE INTERNATIONAL JOINT COMMISSION

The report of the International Joint Commission leaves several major problems of the project still unsolved. Some of these are to be reinvestigated by an enlarged board of engineers and reported on later. Other matters are to be considered by the Committees of the Senate and House of Representatives of the Congress of the United States and of the Parliament of the Dominion of Canada. Lengthy hearings will be had and this Commission has been advised that opportunity will be accorded it to present in extenso any facts, arguments and data against the St. Lawrence project. The Western Central States are not quite so confident of success in foisting upon the United States the enormous expense of carrying out the project as they were a year ago.

MASTERFUL ADDRESS BY GOVERNOR NATHAN L. MILLER, AT WASHINGTON, IN ANSWER TO GOVERNOR ALLEN OF KANSAS AND MR. MERRICK OF CHICAGO, REPRINTED IN APPENDIX "H"

This Commission advises a continuation of its opposition to that project, as it is continually receiving support from other States, which have rivers and harbors to improve within their own confines of far greater importance to them and to the United States, than the wasting of millions of dollars in the St. Lawrence project. This was evident at the recent sessions of the National Rivers and Harbors Congress in Washington, where Governor Nathan L. Miller of New York made a deep impression upon waterway delegates from various States in his reply to Governor Allen of Kansas and Mr. Merrick of Chicago. In his masterful address on that occasion he exposed many of the fallacies of the arguments of the proponents of the St. Lawrence scheme which has gained much headway in the Central Western States and which have found favor among the representatives of those States in Washington. We submit herewith the address of Governor Nathan L. Miller of New York and annex it hereto as Appendix "H." In that address Governor Miller calls attention to much that remains to be done before the United States

becomes committed to the St. Lawrence project. It is not believed that the St. Lawrence Ship Canal will serve any economical commercial purpose when it is remembered that the State of New York has already provided its Barge Canal system between the Great Lakes and tide waters which is free of tolls and adequate to transport all the Great Lakes tonnage destined for the seaboard. Why should the United States spend millions, when the best canals that engineers were able to design have already been constructed by the State of New York at an expense of \$165,000,000, including their terminals?

WORK OF THIS COMMISSION IS AROUSING WIDESPREAD OPPOSITION
TO THE ST. LAWRENCE PROJECT

Such facts as this Commission has been able to collate and present to the public are enlightening the public as to the physical, commercial and international problems involved in the St. Lawrence Ship Canal and Power Project and are arousing widespread opposition thereto on grounds herein and in other reports of this Commission more fully set forth.

With the rapid increase in population in the United States, domestic or home consumption of cereal products is fast approaching their entire production and the surplus thereof for export is gradually diminishing, as may be seen from the statements contained in Appendix "I," hereto annexed.

A critical examination of the Report of the International Joint Commission has been made by the Honorable George Clinton of Buffalo and is contained in Appendix "J" hereto annexed.

All of which is respectfully submitted.

Dated March 16, 1922.

LEONARD W. H. GIBBS,
Chairman.

MURRAY HULBERT,
Vice-Chairman.

HENRY W. HILL,
Acting Secretary.

CHARLES L. CADLE,
FRANK M. WILLIAMS,
JAMES J. WALKER,
SIMON L. ADLER,
CHARLES D. DONOHUE,
Commissioners.

APPENDIX A

THE ST. LAWRENCE SHIP CANAL AND POWER PROJECT

Including the Physical Obstacles to the Canalization, Navigation and the Improvement of the St. Lawrence for Navigation and Power Purposes, which Neither Art Nor Industry Can Entirely Overcome

By HENRY W. HILL

President of the New York State Waterways Association and member of the New York State Commission

PHYSICAL CONDITIONS

A glance at a map of the Northern United States and Canada will show that the St. Lawrence River flows in a northeasterly direction from Lake Ontario to the Gulf of St. Lawrence, a distance approximately of 1,180 miles, nine-tenths of which distance, that is, from St. Regis to the Gulf of St. Lawrence, is wholly within Canadian territory and north of the forty-fifth degree of north latitude, so the river is frozen or flooded with anchor and frazil ice for five months or so every year. Ice jams have occasionally been such in the Long Sault Rapids as to set back the rushing, tumultuous waters and entirely obliterate those rapids and flood great areas on both sides of the river. Ice jams occur in all the other rapids in the upper reaches and also in the Coteau, Cedar, Cascade and Lachine Rapids of the river. At Lachine ice jams would render power production so very expensive, that the engineers do not recommend the development of power in that part of the river. Below Quebec ice flows through Belle Isle Straits and to some extent in Cabot Straits are common for one or more spring and fall months, after and before the four or more months, when the river is entirely frozen over. In the Lower St. Lawrence fogs are frequent and accidents have not been uncommon.

In 1837 the "Albeuria" foundered in the Gulf of St. Lawrence and 525 lives were lost; in 1840 the steamer "Dundee" was wrecked and 292 lives were lost; in 1857 the steamer "Montreal" was lost 15 miles above Quebec with 253 lives; in 1898 the French liner "La Bourgoigne" was in collision off Sable Island and 584 lives were lost; in 1914 the Canadian-Pacific liner "Empress of

Ireland" was in collision with the collier "Storstad" in the St. Lawrence River near Father Point and sank in 20 minutes and upward of 1,000 lives were lost; the commission which investigated that unparalleled disaster found that the navigation of the St. Lawrence is attended with the constant probability of fogs; Captain Kendall said "it was very foggy" and, although the officers of the two vessels saw each other's vessel approaching, the fog settled down so suddenly that they were lost to each other's view and the collision occurred. It will be remembered that the loss of the White Star steamer "Titanic," in 1912, after colliding with an iceberg resulted in the loss of 1,500 lives. That disaster occurred, however, off the banks of the region of icebergs, which is in the usual route of vessels passing between Liverpool and the Gulf of St. Lawrence. Other disasters have occurred in the navigation of the River and Gulf of St. Lawrence, all of which tend to confirm the truth of the statements of navigators, in effect, that the navigation of those waters on account of the constant menace of fogs, snow and ice is most hazardous. It is known as the "Grave-yard of the Atlantic." This is borne out by the marine insurance rates, which increase from midsummer until November, when insurance cannot be had at any rate, and thereupon insurance ceases altogether.

The Belle Isle route, the shorter of the two routes from Montreal to Liverpool, is closed by ice floes to navigation earlier in the fall and is cleared of ice later in the spring than is the southern, Cabot Straits, route.

The channel of the St. Lawrence below Montreal is from 27 to 30 feet deep and 450 feet wide in the straight portions and 600 to 750 feet wide in the bends between Montreal and Quebec, a distance of 160 miles; but it has a width of 1,000 feet in the first 170 miles below Quebec nearly to Father Point, which is 181.6 miles from Quebec. For the remaining distance of 673 miles the river broadens out and flows into the Gulf of St. Lawrence.

Notwithstanding all the physical obstacles to be overcome, engineers may be able to construct prisms, dams and locks adequate to accommodate ocean going vessels of 25 or 30 feet draft between Lake Ontario and Montreal, provided they be given money enough and sufficient time to prosecute the undertaking.

Nothing quite like it, however, has hitherto been attempted. The Panama Canal is about 40 miles long, and one-half its length

is through Gatun and Miraflores Lakes. That involved no such engineering problems as will the construction and operation of dams and locks from the beginning of the Galop to the lower end of the Lachine Rapids in the St. Lawrence River, with all the crooks and turns and other obstacles to be overcome, and how they proposed to overcome them. Some of the difficulties of such an undertaking are reported on by the engineers, who have recently completed their survey of the St. Lawrence River from Lake Ontario to Montreal, a distance of 182 miles.

PHYSICAL CONDITIONS DISCLOSED AND WORKS PROPOSED BY THE ENGINEERS

The total difference in elevation between Lake Ontario and the St. Lawrence River at Montreal is 223.9 feet. They divided the part of the river under consideration into five divisions as follows:

The first division extends from Montreal to Lake St. Louis, a distance of 25 miles, with a difference in elevation of 45 feet to be overcome by means of two locks and guard lock. The second division extends from Lake St. Louis to the outer end of the breakwater in Lake St. Francis, a distance of 16 miles, with a difference in elevation of 83 feet to be overcome by means of two locks and one guard lock. The third division extends from Lake St. Francis to the head of St. Regis Island, a distance of 28 miles, with a difference in elevation of 3 feet. The fourth division extends from St. Regis Island to Chimney Point, a distance of 48 miles, with a difference in elevation of 92 feet to be overcome by three locks, and the fifth division extends from Chimney Point to Lake Ontario, a distance of 65 miles, with a difference in elevation of 1 foot.

The first division consists of 13 miles of canal and 12 miles of river, the second division consists of $13\frac{1}{2}$ miles of canal and $21\frac{1}{2}$ miles of river, the third division consists of no canal and 28 miles of river, the fourth division consists of $7\frac{1}{2}$ miles of canal and $40\frac{1}{2}$ miles of river, and the fifth division consists of no canal but 65 miles of river.

Nearly all of the river sections of the five divisions require more or less dredging, as the reaches of the river between the canal sections are too shallow to admit of navigation by vessels of 25 feet draft, much less by vessels of 30 feet draft. The engineers say that the length of the dredged channel from Montreal

to Quebec is so great that many engineers and others at various times have advocated the construction of a dam in the river below Montreal in order to increase the depths of the harbors and avoid excessive dredging. The depth of water in the St. Lawrence at and below Montreal at times is only 27 feet and at places the depth of water in the St. Lawrence above Montreal is less than 20 feet. The project from Heron Island to Lachine requires dredging to obtain sufficient depth and width for navigation purposes but also the enlarging the cross-section of the river to such an extent that flood flows entering Lake St. Louis can be discharged without creating velocities so great that ships would be unable to navigate the waterway. It will be necessary also to excavate an additional channel 300 feet wide on the south side of the river below Caughnawaga and the raising Lake St. Louis to an elevation of 71 feet, its mean level being 68.9 feet and the mean level of Lake St. Francis being 152 feet above sea level. In the short distance of 15.6 miles between these lakes there is a difference in elevation of 83 feet to be overcome by locks. Several power plants in this division would be destroyed, if the river were dammed below the Cascade rapids. Therefore, the engineers recommend a canal on the south side of the river from the village of Melocheville round southwesterly four miles distant from the river up through two locks of 41 feet lift each and thence back into that part of the river known as Lake St. Francis. The side canal would be $13\frac{1}{2}$ miles long and dredging must be done for two miles or more in Lake St. Francis and protecting dykes and breakwaters carried out to the deep waters of the lake. From Hungry Bay in Lake St. Francis it will be necessary to dredge a channel 450 feet wide and 25 feet deep at low water, wherever that does not exist in the 28 miles course, through that lake to the head of St. Regis Island. That is all in the third division. The estimated cost of such dredging is \$1,158,000.

In the fourth division of the river from St. Regis Island to Chimney Point a distance of 48 miles, there are the Long Sault, Farran Point, Rapids Plat and Galop Rapids with an aggregate fall of 92 feet, all of which sections of the river are non-navigable for upstream vessels, except from the head of Ogden Island to Iroquois, a distance of $3\frac{1}{2}$ miles, there is a channel 30 feet deep. In that Fourth Division of the river navigation for 25 feet draft vessels can only be secured by extensive dredging some sections and damming other sections to form a series of deep pools.

From Lake St. Francis to the west end of Cornwall extensive dredging will be required. A canal is to be constructed from the Cornwall side of the river along the northern side of the river for six miles crossing the Cornwall canal and connecting lower lock No. 7 with upper lock No. 8 and then entering the river through guard gates behind a crib-work retaining wall on the river side. An earth dam is to be constructed on the west side between lock No. 8 and the guard gates. The water level will be raised by lock No. 7 about 48 feet and by lock No. 8 about 31 feet so that the water will stand at an elevation of 231 feet, which is only about 10 to 12 feet lower than the mean surface level of Lake Ontario.

At Ogden Island are to be a regulating dam and lock No. 9 to raise the water from elevation 231 feet to the regulated level of Lake Ontario, approximately 243.41 feet above sea level. Some coffer-damming, much dredging and other costly river improvement work will be necessary to widen and rectify the channels, to remove rocks, shoals and projecting reefs and otherwise to improve the river from Ogden Island to Lake Ontario.

Lake Ontario, whose area is 7,269 square miles, has a variation of 5 feet in elevation above the sea and a varying discharge flow of from 185,000 cubic feet per second to 320,000 feet per second. One foot in elevation of the water of Lake Ontario is equivalent to a flow of 80,000 cubic feet a second for a month. So it may be appreciated what a fluctuation of 5 feet represents in increased volume of water to be provided for in the St. Lawrence. Such fluctuation in the flow into the St. Lawrence river will necessitate the construction of a dam at Ogden Island, or a barrage at the outlet of the lake to prevent future ice jams and floods that no ordinary dams or hydraulic structures could withstand.

The foregoing are some of the obstacles that will be encountered in making the St. Lawrence navigable for vessels of 25 feet draft between Montreal and Lake Ontario. Still others will be encountered in undertaking to develop power in any of the three divisions, where that may be done. The engineers do not recommend that any power be developed for the present except in the fourth division, as there is no market for the maximum amount of approximately 4,100,000 horsepower, which they estimate may be generated between Lake Ontario and Montreal. They say it would not be "sound economic procedure to develop a vast quantity of power," when there is no market for it.

Therefore they advise that there be no attempt at present to develop power except at the Long Sault Rapids and vicinity. To accomplish that, they recommend the construction of a series of dams, both earth and concrete. One of such dams is to be 3,900 feet long with ten gates at the east end, each of 50 feet length, and it is to have a spillway in the center 2,500 feet long and fifteen gates each 32 feet long at the other end.

This and the other dams in this vicinity are designed to raise the river level from 159 feet to 231 feet above the sea, a total lift of 74 feet. It is proposed to construct a dam across the south channel of the Long Sault Rapids, which is to have four gates 50 feet wide and six gates 32 feet wide and a spillway 200 feet wide. Another dam is to be constructed across the lower end of Long Sault Island with openings of vertical rock faces of 250 to 340 feet wide through it for passing the diverted flow through a channel to be cut from the north shore of that island across the island to the south channel, which latter dam and channel are to be closed, when the principal dam at the Long Sault is completed.

Still another dam with a lock is to be constructed at Ogden Island that will raise the water from water level there of 231 feet to the new to be regulated level of Lake Ontario of not less than 243.41 feet above sea level. That will be subjected to extraordinary ice pressure and a heavy flow of water in westerly gales down Lake Ontario, whose waters at its outlet some times rise to an elevation of 246 feet above sea level. A diversion cut is also proposed through Ogden Island to increase the discharge capacity of the dam and to assist in the formation of an ice cover above the water dam. The dam across the north channel in its submerged gate section will have twenty-six gates 16 feet by 24 feet with a 600 foot spillway and in its stony gate section twenty gates 40 feet by 21 feet. The dam across the south channel will have twelve gates in its stony section 40 feet by 18 feet.

An earth dam and concrete retaining wall must be constructed from lock No. 8 to the main land above Moulinette as high as the Long Sault dam. Earth dams with concrete core walls are proposed to extend from the structures at lock No. 8 to Sheek Island and the Canadian side. A number of other earth dams and embankments and ice diversion structures are proposed as necessary to hold up the water level required at the Long Sault. All such are described in the engineers' report. Enough of these have been described to indicate the complexity and magnitude of the

project and the engineering difficulties that will be encountered if it be undertaken.

The main power plant is to be located at the east end of Barnhart Island, which will have fifty-two units. That plant is estimated to produce 1,408,000 horsepower on the basis of 88 per cent over all efficiency. It is proposed to change the alignment of the International Boundary so it will pass between the power houses at Barnhart Island, where several embankments will be required to prevent flooding and to keep up a uniform head of 74 feet.

The other power plant will be located at the upper end of Long Sault Island with seven units under a head of 29 feet and a flowage of 20,000 cubic feet per second. That plant is estimated to produce 58,000 horsepower on the basis of 88 per cent over all efficiency. These percentage estimates are very liberal. It is quite generally assumed that there is a loss of 15 per cent to 20 per cent of the potential energy of water power in its generation and conversion into electric energy. However, the total amount of energy to be developed at both power stations within the \$252,728,000 is only 1,464,000 horsepower and not 4,100,000 as quite generally and erroneously represented.

Such production, if that were possible, developed in conjunction with the construction of a 25 foot channel would involve an initial expenditure of \$488,211,208 and if constructed in conjunction with a 30 foot channel, it would involve an initial expenditure of \$506,197,300. These are the estimates of the engineers and undoubtedly are underestimates, for it is hardly possible to foresee all the obstacles that will be encountered in the prosecution of such a vast undertaking as the St. Lawrence Ship Canal and Power Project down a river that is occasionally blocked with ice jams, flooding thousands of acres, and whose vast rushing, tumultuous waters rush down slopes aggregating 92 feet in a distance of 48 miles, then again rush down slopes aggregating 83 feet in a distance of 15.6 miles, and then again rush down slopes aggregating 45 feet in a distance of 25 miles.

The people of this country will recall the fact that the estimates for the Panama Canal were only about two-thirds of its final cost.

It will be necessary to improve the river channel most of the distance from Ogden Island to Lake Ontario. In that reach of the river are Galop, Lalone, Lotus, Adams, Butternut and the

Thousand Islands, with their projecting points, submerged extensions and underlying reefs rendering it hazardous for vessels of light draft to navigate that part of the river. Ocean going vessels could not do so until the channel is rectified and greatly improved.

FLOODING OF LANDS AND VILLAGES

The International Joint Commission advise that there be an exhaustive investigation of the extent and character of the flowage before the work begins. The project, if undertaken, will necessitate the flooding of 15,371 acres, or about 24 square miles of lands. The engineers say that "parts of the villages of Dickinson's Landing, Farran Point, Aultsville and the outskirts of Morrisburg on the Canadian side and Louisville Landing and Richard's Landing on the American side will be flooded. The hydro-electric plants on the Canadian canals at Cornwall, Sheek Island, Morrisburg, Iroquois and Cardinal will be put out of commission. At Morrisburg there is a business section the surface elevation of which is about 238, but as the cellars and sewers are lower the raised level would do injury to this town were the water allowed free entry. In order to protect this section it is proposed to construct a substantial dyke around it and to lead all the sewers and storm-water drains into a covered tank from which it will be pumped into the river. It will be possible greatly to reduce the drainage area, the water from which has to be pumped, by constructing intercepting sewers."

This illustrates other obstacles to be overcome in the construction of the St. Lawrence Ship Canal and Power Project and in the installation of hydro-electric dams and embankments necessary to develop electric power.

An inspection of the preliminary survey maps and outline sketches merely of the engineers will show the complications in the proposed structures and the danger of their being carried away by great fields of floating ice and ice jams, the damage from which in the destruction of property and in the loss of life no man can estimate. The engineers realized that danger and have suggested the construction of ice diversion, concrete curtain walls on angles to the current between Sheek and Barnhart Islands and other structures elsewhere, but who shall say what can or will withstand the ice floes and ice jams of the St. Lawrence when its turbulent, voluminous waters are obstructed by dams, embankments and walls as proposed? It is very doubtful whether

the use of compressed air or heating the gates by electricity will keep them free of ice jams.

Colonel Hugh L. Cooper, acknowledged as the most eminent hydraulic engineer in the United States, stated recently before the International Joint Commission at Ottawa that when the ice broke up in the St. Lawrence River there would be a volume of 950,000 tons of ice moving hourly down against the dams, embankments, wheel pits and hydraulic structures if the plans proposed for the improvement of the St. Lawrence River by the engineers of the United States and Canada were adopted, and that such volume of flowing ice at times would put the hydraulic machinery out of commission, if it did not entirely destroy them.

LAND-LOCKED ARTIFICIAL CANAL SECTIONS

All the artificial canal sections, aggregating 34 miles in length, of the proposed waterway are north of the international boundary and wholly within the Dominion of Canada. In the event of any foreign war between Great Britain and any other nation, any one of such artificial canal sections may be entirely closed to American vessels and, in any event, all such artificial canal sections will be under the sovereign control of the Dominion of Canada. Why is it proposed to so construct such artificial canal connecting sections of the waterway when the survey of the United States Engineers on Deep Waterways in 1900 reported that it was possible to construct a ship canal down past the Long Sault Rapids within the territory of the United States? Why should the United States contribute to the construction of a ship canal entirely in foreign territory, through which merchantmen and ships of war may pass without let or hindrance to the Great Lakes?

Without a cession of territory, the entire length of the St. Lawrence River, five or ten miles back from the river, constituting a zone like the Panama Canal zone, secured by treaty with the Republic of Panama (*Watson v. Shaw*, 204 U. S. 24), which shall be neutral territory or under the joint sovereign control of both nations, is it wise or a sound national policy for the United States to unite in such a project as the St. Lawrence Ship Canal and Power Project?

No one is able "to dip into the future" far enough to foresee what international exigencies and complications may arise in another half century to disturb existing conditions, and neither

nation should be subject to such internal naval attack as would be possible if the St. Lawrence River were made navigable for naval vessels.

POWER RESOURCES

The engineers, on an 88 per cent over all efficiency, estimate there may be developed 1,464,000 horsepower along the international boundary, one-half of which, namely, 732,000 horsepower, would belong to the United States and an equal amount of power would belong to the Dominion of Canada.

The Interior Department of the Dominion of Canada estimates that its entire water resources will permit the turbine installation of 41,700,000 horsepower, of which only 2,762,880 horsepower have thus far been developed. The United States have still a greater amount of undeveloped water power wholly within its jurisdiction and so distributed as to be marketable where needed; whereas, the entire potential water power of the St. Lawrence, but not commercially marketable, is estimated at 4,100,000 horsepower. The engineers do not recommend the development of so vast an amount of power for several reasons, stated in their report, among which they say is that "a market to take this output is not now in existence and cannot be expected to spring into being at once," and that in the first division of the river, that is, between Montreal and Lake St. Louis, the ice flows make "the development of power more uncertain and expensive than at other sites higher up."

All the power, except 1,464,000 horsepower developed along the St. Lawrence, will be below the international boundary line and wholly within the sovereign control of the Dominion of Canada. The cost of the development of the possible production of 4,100,000 horsepower in conjunction with the construction of a 25-foot waterway is estimated by the engineers at \$488,211,206, and if developed in connection with the construction of a 30-foot waterway it will cost \$506,197,300. These are estimated for initial cost of construction, but are they based on such details as to insure their accuracy? The upkeep and operating expenses for such project will be very large and in case of damages to any one of such public works by floods and ice jams, the expenses thereof no man can estimate. The engineers estimate the annual cost of operation, maintenance and depreciation of the hydraulic and electrical machinery of the project to produce 1,464,000 horsepower will be \$1,457,000, exclusive of the annual cost of the operation, maintenance and depreciation of the waterway in that Fourth Division.

They estimate the cost of developing 1,560,000 horsepower in the Second Division at the Coteau, Cedar, Split Rock and Cascade Rapids at \$151,688,000. In addition to such initial cost of construction will follow the damages sustained in the destruction of all the power plants in the rapids in that Second Division. Such plants are those of the Cedars Rapids Power Company, of 129,600 horsepower, the Canadian Light and Power Company, of 28,000 horsepower at its Cedars Rapids power house and 9,000 horsepower at its Valleyfield power house. The engineers estimate damages resulting from the destruction of such power plants at \$20,400,000, which will be additional to the \$151,688,000, the estimated initial cost of the development of the possible 1,560,000 horsepower in the Second Division. In view of this and for other substantial reasons stated in their report, the engineers say that "the development of power at the Cedars plant need not be interfered with until the conditions of the country require the more efficient use of the water used by it."

The engineers do not recommend any attempt at power development in the Third Division from the end of the breakwater in Lake St. Francis to the upper end of St. Regis Island, a distance of 27.8 miles, with a maximum drop of 3 feet, but at mean flow having a drop of 1 foot. In that Third Division the engineers say it will be necessary to dredge a channel 450 feet wide and 25 feet deep at extreme low water much of the distance at an estimated cost of \$1,158,000. Such channel cannot be provided by raising the level of Lake St. Francis, for that would flood great areas of low lands in the vicinity of the Old Beauharnois Canal. The engineers do not recommend the development of any part of the possible 860,000 horsepower at the Lachine Rapids and elsewhere in the First Division. They say that "the ice conditions in that division make the development of power more uncertain and expensive than at other sites higher up." The water surface at the head of Lake St. Louis becomes so overlaid with the accumulation of ice from above that it piles up until it forms such a slope that the ice is carried down the Lachine Rapids. The engineers say that "during the Spring of 1886, 1887, 1904 and 1913, the water level was raised by ice-jams below Montreal to an elevation of 52 feet and under such conditions there would be no power available" at the proposed dam to raise the water level of LaPrairie Basin to elevation 52 feet, which would flood the greater part of the town of LaPrairie and great areas between it and the village of St. Lambert and require exten-

sive dykes to prevent the flooding of Montreal. The foregoing are still further obstacles to the production of all the potential water power resources of the St. Lawrence River.

The St. Lawrence project for water power development purposes is accordingly and necessarily reduced to such development as may be made in the Fourth Division, where the amount of power that may be generated is only 1,464,000 horsepower and the obstacles to that production are many as already stated. That does not exceed the available undeveloped power in the State of New York, and only slightly exceeds that available along the Ottawa River in Canada, in neither of which jurisdictions can any legal or international complications arise, either as to its production or distribution.

ESTIMATED WATER POWER RESOURCES OF THE UNITED STATES

In 1916, the Water Power Development Association estimated the maximum potential water power within the United States (without storage) at 60,713,200 horsepower, and that 77.2 per cent of which will require Federal permits. Only 8.8 per cent of the maximum amount of water power, according to the Merrill Report, has been thus far developed. It is widely distributed and therefore ready markets may be had within available distances of its production. Why not develop such water powers wholly within the United States and where most needed, rather than join with Canada in developing the water powers of the St. Lawrence, the larger part of which are below the international boundary line, where in the event of international complications the power may be turned off, as it was at Niagara Falls during the late World War, notwithstanding the fact that the capital invested to produce such power was largely American capital? The Water Power Development Association in its report for 1916 estimated the potential water horsepower in each of twenty different States of the United States to be upwards of 750,000 horse power, which is a greater amount of power in each of such twenty States than will be available for the entire United States as its one-half share of the entire development of the 1,464,000 horsepower of the St. Lawrence above the international boundary line. Such power in each of the States could undoubtedly be developed and delivered at the switchboard available for use quite as economically as that of the St. Lawrence River. Colonel Cooper has stated that the cost of the St. Law-

rence project, as recommended by the engineers, including interest on the investment, maintenance and care of the structures and an allowance for depreciation up to the time of any return on the investment will amount to \$1,000,000,000 instead of \$252,728,200 as stated by the engineers.

Furthermore, the available undeveloped potential energy of the Niagara from La Salle to Lewiston, a distance of fifteen miles, amounts to as much as the entire undeveloped potential energy of the St. Lawrence from Lake Ontario to Montreal and Niagara power may be more easily and economically developed than that of the St. Lawrence. Why experiment with the destructive ice-jams of the St. Lawrence to develop power until the water resources of the Niagara are fully developed and marketed?

THE ST. LAWRENCE SHIP CANAL AN UNECONOMIC PROJECT

The St. Lawrence Navigation Project is likewise an uneconomic undertaking.

The distance from the Gulf of St. Lawrence quite generally be-fogged and for two or more months of the six or seven months of open navigation, is 2,200 or more miles from Lake Superior ports, which are 600 feet above the level of the ocean. The channels are those of the St. Lawrence for 1,180 miles to Lake Ontario, with nine locks of varying lifts of 9 to 48 feet, the Welland canal for 25 miles with seven locks with lifts of 47½ feet, the Detroit river, 31 miles long, dredged about 22 feet deep, Lake St. Clair with a dredged channel about 24 feet deep for 30 miles, St. Clair river about 40 miles long with its channel dredged about 22 or 24 feet and St. Mary's river 66 miles long via one channel and the other channel 73 miles long, both dredged about 22 or more feet deep with its locks of 18 or 20 feet lift at Ste. Marie rapids. All such connecting channels above Lake Erie must be dredged deep enough to accommodate vessels of 25 feet draft or of 30 feet draft in the event the St. Lawrence is to be made navigable for vessels of like draft. Furthermore all harbors on the Great Lakes must be dredged to a like depth and the locks at Ste. Marie must be reconstructed to admit of navigation by ocean going vessels of 25 or 30 feet draft. In 1900 George J. Wisner of the U. S. Board of Engineers estimated the cost of deepening such connecting channels and harbors at \$7,000,000 for each additional foot below the existing standard depth of 22 feet. Since 1900 the cost of such dredging has greatly increased and it may be said that on

the 80 per cent increase estimated by the engineers of the St. Lawrence Project for that work over pre-war prices, that the expense of deepening such connecting channels and harbors would be at least \$12,600,000 for each additional foot and if such channels be also widened as may be necessary, the cost thereof would be \$14,000,000 for each additional foot of dredging. That would make the cost thereof for 5 feet \$70,000,000 and for 10 feet \$140,000,000, in addition to the enormous expense to each city and individual for dredging in front of municipally and privately owned piers and wharves, otherwise ocean-going ships could not dock at such piers and wharves.

Who can estimate that cost? None of these matters has been reported upon by the engineers, but all these connecting channels and harbors and the waters in front of municipally and privately owned piers and wharves must be dredged before ocean going vessels can navigate them or dock at such piers and wharves. The cost of the construction of an ocean-going vessel to withstand the storms of the high seas is considerably greater than the cost of the construction of Great Lakes' vessels of similar displacement and their carrying capacity on account of their much greater dead weight is much less than the carrying capacity of Great Lakes' vessels. Furthermore, larger crews, greater insurance and other operating expenses materially increase the cost of the navigation of ocean vessels, so they cannot successfully compete with Great Lakes' carriers in the service of transporting cargoes between the upper and lower Great Lakes' ports.

Before the World War, such Great Lakes' vessels transported lake tonnage as low as 50 cents to \$1.00 per ton for approximately a thousand miles' haul. Nor is it believed by owners of vessels operating on the Great Lakes and on the ocean, that ships with only such limited cargoes as are available, can profitably ascend the St. Lawrence, passing up through its long tortuous channels and the canal sections and through the locks, necessarily subjecting such vessels to inevitable delays daily and then passing through the connecting channels between the Great Lakes to up-lake ports and there taking on smaller cargoes than are carried by Great Lakes' vessels and then returning down through all such connecting channels, canal sections with their locks, and through the St. Lawrence channels to and over the ocean. It is not believed by vessel owners, that there would be an adequate return on capital invested in vessels engaged in such service. Approximately

18 to 20 days would be required to make such a trip from the Gulf of St. Lawrence to any one of the Lake Michigan or Lake Superior ports and return and the trip to Liverpool and return would require 12 to 15 days more, so that a vessel would not make more than 5 to 6 trips and possibly less during the limited season of navigation on the St. Lawrence, whereas in ocean service they would make nearly twice that number of trips across the Atlantic and return in the same space of time and have full cargoes both ways.

It is very doubtful as to whether ships from any European port would find a full cargo for any one of the half dozen ports of the Great Lakes. The heavy tonnage is not moving from foreign ports to the ports of the Great Lakes and the time is not very distant when there will be no grains to ship from the United States to any foreign port. Under normal conditions less than five million tons of grains are exported from the Great Lakes' region to European ports. With the rapid growth of our cities and industrial centers and the exhaustion of all cereal-producing areas, the time is not distant when the production will not exceed domestic consumption and thereafter there will be no grains or cereals to export. Hitherto less than one-tenth of the entire tonnage of the Great Lakes except during the World War, reached the seaboard. In ten years there may be no grains or other cereals produced in the United States to export and if any, at that time, the volume will be so small, that it will not pay the United States to pay the interest charges on one-half of \$252,728,000, and one-half of \$2,562,000 estimated as the amount charged for the operation, maintenance and depreciation of the St. Lawrence Ship Canal and Power Project.

The estimate for operation, maintenance and depreciation does not include the interest on \$126,364,000, which the United States will be obliged to pay if the project be undertaken as outlined in the engineers' report. It is not generally believed by owners of vessels that there would be any reduction in the carrying charges on products originating in the Great Lakes' territory via the proposed St. Lawrence route below the prevailing rate under normal and not World War conditions via the Great Lakes, the Erie Canal and the ocean from New York to Liverpool. From 1910 to 1915 the average cost of transporting a bushel of wheat from the head of the Great Lakes, that is Duluth, Fort William and Port Arthur, to Liverpool via the "all water" route through New York, includ-

ing all charges was $10\frac{3}{4}$ cents. How some western papers can assert that the present St. Lawrence rate has saved \$6,750,000 on 15,000,000 bushels of grains exported via Montreal last season is inexplicable, except on the theory that in their zeal to promote the St. Lawrence project, they were oblivious of transportation rates and expect that their readers will not question their statements. The alleged saving is equivalent to the saving of 45 cents per bushel when the differential via Montreal was not more than $4\frac{1}{2}$ cents per bushel at any time. Most of the season of 1921 the differential was less than 2 cents per bushel. In the fall the "all water" route rate from Chicago to New York was approximately $10\frac{1}{2}$ cents per bushel on wheat and the rate on wheat from Chicago to Montreal was from 9 to $9\frac{1}{2}$ cents per bushel. The ocean rate from Montreal to Liverpool was substantially the same as the New York to Liverpool rate, though usually the Montreal-Liverpool rate is greater than the New York to Liverpool rate.

With comparatively rare exceptions the New York rate is as low or lower than the Montreal rate so that wheat has been shipped in large quantities from the Western Canadian provinces down the Great Lakes to Buffalo, thence to the Atlantic ports and thence overseas, because the freight rate was lower than it was via any other route.

The "all water" rate down the Great Lakes and over the Barge canals of New York and thence by ships to European or other foreign ports will be lower than it is possible to maintain freight rates on ocean going vessels, passing from the Great Lakes down the St. Lawrence and overseas and then returning with small or no cargoes back through the befogged, restricted and tortuous channels from sea level up through 18 or more locks, with their inevitable delays to the elevation of Lake Superior, 601 feet above the level of the sea, whose ports are 2,200 miles from the Gulf.

William E. Chandler, manager of the Transportation Bureau of the Boston Chamber of Commerce, in his forcefully stated objections presented to the International Joint Commission on Boundary Waters against the St. Lawrence Ship Canal and Power Project, clearly shows that grains would not move from the Great Lakes to New England ports, nor to small Atlantic ports, because such ports are not provided with elevators for unloading such grains and that the products of the factories of

New England would not move to coastwise ports for shipment on vessels passing from the Atlantic coast to the Great Lakes, on account of the local freight rates on such products transported from the factory to the Atlantic ports and that there would be no cargoes for vessels from the Atlantic coast to the Great Lakes' ports, which would pay the cost of operating vessels from the sea-board to the ports of the Great Lakes.

CONSUMPTION OF AMERICAN CEREAL PRODUCTS IN THE NEAR FUTURE WILL EQUAL THEIR PRODUCTION

The consumption of the cereal products of the West is being yearly consumed in increasing quantities and at the present rate of increase in population, such consumption of American cereal products will increase, while at the same time, the production of cereal products in the West is decreasing on account of the exhaustion of the cereal producing states. In other words, the American grains will be entirely consumed in America in the near future and there will be no grains for export. In fact, the records show that prior to the World War, less than 5,000,000 tons of cereals were exported from all the Atlantic ports and only a part of such exports originated in the Great Lakes' territory. When American consumption equals American production of cereals, as it may do within the next ten years, then there will be no grains to ship down the St. Lawrence, nor in fact for export from any Atlantic port. Mr. Hoover predicts that the consumption of the American products will equal their production in ten years, unless there be a marked increase in cereal producing areas, which is quite improbable. The engineers report that it will take eight years to complete the St. Lawrence Ship Canal and Power Project. If these statements be true, then there will be little or no American grains for export by the time the St. Lawrence Ship Canal and Power Project is completed.

The strongest advocates of that project are dealers in grains from Canada, who are urging the United States government to build a ship canal down the St. Lawrence, in order that such dealers in Canadian grains may ship such Canadian grains via the St. Lawrence to Liverpool. In other words, they want the United States to pay one-half of the expense of the construction of a ship canal down the St. Lawrence, largely for the transportation of grains, which they are purchasing in Canada and which are destined for export. The official records show the large

transit of grains from Canada through Duluth and other Superior ports. That accounts for the activities of some of the advocates of the St. Lawrence Ship Canal and Power Project.

It is hardly conceivable that the American people will be misled as to the uneconomic aspects of the proposed St. Lawrence Ship Canal and as to the obstacles to its construction as a Power Project by the propaganda disseminated by foreign and other waterpower companies and by those who have special interests to subserve.

AMERICAN MONEYS SHOULD BE SPENT ON AMERICAN WATERWAYS, WHICH WILL SERVE THE TRANSPORTATION INTERESTS OF THE COUNTRY

Why squander millions in the visionary St. Lawrence Project, when millions are needed to carry forward river and harbor improvements wholly within the United States to enable water carriers to transport American products to market and to relieve railroad congestion, wherever it exists, between the areas of production and centers of consumption? American money should be expended for American waterways and not be used, to the neglect of American waterways, to build canals wholly in foreign territory and to canalize the St. Lawrence river for the larger part of the distance wholly within Canadian territory. The needs of the Hudson, the Delaware, the Susquehanna, the Tennessee, the Ohio, the Missouri, the Mississippi, the Cumberland and scores of other rivers of the country are awaiting improvement on account of lack of appropriations, although their improvements have been recommended by the Board of Engineers of the United States Army, and in their improved condition they would serve the transportation interests of the country a thousand times more than the proposed improvement of the St. Lawrence.

APPENDIX B

THE ST. LAWRENCE PROJECT—A TRANSPORTATION FALLACY

By WILLIAM H. CHANDLER

Manager, Transportation Department, Boston Chamber of Commerce

A great deal has been said and much written about the advantages of the proposed "Great Lakes St. Lawrence Ship Canal proposition." Its advocates here in New England point not only to the very heavy tonnage handled by vessels on the Great Lakes but also call attention to the electrical power that will be a by-product, to a large extent, of this needed waterway development, and to the advantages to be derived by New England in the form of cheap power.

Mr. Harriman, who is directly interested in the development of electrical energy, has previously undertaken to show in *Current Affairs* the advantages that would accrue to New England by this development of the St. Lawrence as well as the benefits to the western States that produce such a large volume of tonnage, particularly of food products and the mines.

The chief arguments of the west are that this outlet is needed for its exports; that it should not be denied access to the sea; that its further development should not be retarded by high rail transportation costs to the seaboard. In its campaign for support the west has left no stone unturned to show the magnitude of its tonnage and its importance to the world in the matter of food supply. It has heard the call of the sea; in its imagination it sees the lake ports filled with vessels of all nations; by the engineering skill of man, nature and the elements will have been overcome, although in previous times no great ocean route has been developed where navigation is closed by ice or beset by fogs five months during the year and where the cost of marine insurance via competitive routes is measurably less.

But assuming that these difficulties are not so great as painted by steamship builders, owners and operators, and by engineers

and commissions that heretofore have studied the St. Lawrence route, let us examine the recent studies that have been made to ascertain whether the weight of testimony is in favor of the theorist who can picture the canal in successful operation, filled with the vessels of commerce, the power developed a by-product, paying not only the annual upkeep by contributing toward a sinking fund for the payment of the cost of construction.

The engineering problems of the canal can best be judged by the studies made by those competent to speak with authority on this phase of the question. The opinion of the laymen is of little or no value in such matters. Such surveys as have heretofore been made point out the great difficulties of construction and high cost of maintenance of a canalized St. Lawrence, and so far as can be determined, the engineers have in every case reported adversely on the project being either a practicable waterway or an economic necessity.

The State of New York in 1920 appointed a commission to report on this question. Its preliminary report has been filed, and that report contains much of information that the laymen should study before attempting to pass judgment on the practicability of this development.

That report calls attention to the difference in distances via the St. Lawrence and via the port of New York from Duluth to certain foreign ports—408 miles shorter to Liverpool—about 200 miles to Southampton, and to French and Southern European ports, the distance via the St. Lawrence is as great or greater than via New York, but it is pointed out that the physical obstacles via the St. Lawrence route are far more serious than the difference in distances via the several north Atlantic ports. The mouth of the St. Lawrence is exceedingly dangerous to navigation and is known as "The Graveyard of the Atlantic." Insurance rates are figured accordingly—not only on the cargo but on the vessel itself.

The navigation of any canal by ocean vessel is necessarily slow and where numerous locks are to be negotiated, progress is much slower. Even between the lakes, the channels are narrow and of a depth suited to lake boats rather than ocean vessels.

The St. Lawrence development received the attention of government engineers from time to time but none have reported favorably. (See report of Board of Engineers on Deep Waterways, between the Great Lakes and the Atlantic Tidewater in 1900. House Document 149—2nd Session, 56th Congress.)

But as the New York Commission has pointed out, the probable cost and difficulties of construction are not all of the objections to this project. That Commission calls attention to the great difficulty of navigating an ocean vessel through the ice-flown and befogged St. Lawrence and especially through the Lachine, Soulanges, Long Sault and Gallop canalized sections of the river with the short bends, cross currents that will necessarily be encountered with their dozen or more ship-locks, and says that this has never been told and can only be imagined by experienced navigators. The entire waterway from the Gulf of St. Lawrence to Duluth except through the open waters of Lakes Ontario, Erie, Huron and Superior, consists of narrow, restricted and much of the way of tortuous channels wherein navigation by ocean going vessels would be difficult and very costly on account of the delays incident thereto. Attention is also directed to the fact that ship owners do not seek such waterways for profitable navigation but that they prefer the open sea, where there are no restrictions as to width or depth of channels, no locks intercepting their progress nor any limitation as to speed.

The limit of speed through the Suez Canal is 6.1 miles per hour; through the Amsterdam Canal 5.6 miles per hour; through the Kiel Canal 6.2 miles; through the Manchester Ship Canal 6 miles per hour. All except the Manchester Canal are practically sea level canals with very little lockage and still the speed is less than one-half speed of ocean-going vessels in the open sea. Duluth is 601 feet above sea level, and the route will be intercepted by 20 to 21 locks of varying lift, several as much as 46½ feet and several probably will be greater but all will retard the progress of any vessel on the route. In addition to the locks the channels connecting the lakes will also have to be negotiated at reduced speed, all of which will make for delay and will therefore increase the cost of operation.

It can be safely stated that going full speed the factor of safety required in the depth of water between the vessel and the bottom of the channel is from 6 to 10 feet, but as the maximum depth of water in the Lake channels is only 20 to 21 feet, a vessel would have to be loaded so as to take full advantage of the minimum depth, and this would require at least 3 feet of water under the vessel, which would limit its draft to not more than 18 feet fully loaded. This would necessitate greatly reduced speed in the channels.

So with the delay caused by ice, fogs, locks, tortuous channels between the sea and the lakes and restricted speed in the channels of the lakes, it is apparent that the time consumed between the sea and the head of the lakes would be materially greater than that consumed in making the same distance in the open sea, and therefore charter rates from and to the head of the lakes would be materially greater than on any open ocean route. Furthermore, this charter rate would materially affect the freight rate which would not only be increased because of the additional time in transit but also by the very much higher insurance rate on both cargo and vessel.

Generally speaking, there are no vessels at present which can be profitably operated in ocean service drawing as little as 18 feet loaded. Twenty-four feet is the minimum draft that is being operated profitably and while it may be possible to construct a vessel that will transport 8,000 tons on an 18 foot draft and at the same time be operated safely on the open sea, there is no record so far as has been shown of such vessels being available at the present time. As such a vessel could be operated in lake and ocean service not exceeding 7 months in the year; and as there is now a large surplus of vessels that cannot find ocean cargoes, is it at all probable that such vessels would be constructed for such limited operation?

When the layman speaks of insurance he generally has in mind the risk on the cargo but the vessel must also be covered and assuming the value of any vessel adapted to this ocean, river and lake service to cost as little as \$500,000 (and this special construction would probably cost more) the difference in cost of insurance on the vessel would be a factor of prime importance in making the rate on the cargo to which would also have to be added the extra cost of insurance on the cargo.

From the best information obtainable the present rate of insurance from Boston to Liverpool on a vessel rated A1 for insurance is:

Hull, 5 per cent per annum. Cargo from 18-100 to $\frac{3}{4}$ of 1 per cent per voyage, the rate from Duluth obtained from the same source is estimated to be from two to three times as great as from Boston depending on the class of vessel. This is a difference in cost of insurance in round figures of from \$25,000 to \$50,000 on the vessel alone, to which would have to be added for rate making purposes the charter rate per day for the additional time con-

sumed in making the extra 4,400 miles from the ocean to the head of the Lakes and return from which, of course, would be deducted 800 miles of open ocean navigation in the case of Liverpool by reason of the shorter route, but in case of French or Southern European ports the 4,400 miles of restricted navigation would be encountered as there is no saving in distance. There is a further probability of delay on account of fog in the vicinity of the entrance to the St. Lawrence which is not likely to be encountered at Boston or other North Atlantic ports. All this assumes that during the period of navigation the canalized river is not obstructed as has been the Cape Cod Canal at times by the stranding of vessels while passing through.

In House Document 1591 — 65th Congress, page 21 — attention is called to some of the difficulties in constructing the canal from Richards Point to the mouth of the Grass river, a distance of 10.6 miles, where there is a fall of 48 feet, which would have to be overcome by constructing a canal through the flat country to the south of the St. Lawrence river, with a lock of 48 feet lift near the lower end; the chief of engineers said, in effect, that this was impracticable on account of the water power development there by the St. Lawrence River Power Company. This document also points out the necessity for increasing the depth of channels and the various harbors in the Great Lakes if the route were to be made practicable for ocean-going vessels.

The cost of improving the channels and harbors to a depth that would make possible the navigation of the lakes by ocean vessels is estimated at \$12,000,000 for each additional foot of depth and an annual maintenance cost of \$450,000 for each foot so deepened, and this does not include the cost of widening any of the channels. All lake ports are not dredged to the same depth.

House Document 86 — first session of 55th Congress which was a report by the Secretary of War on the practicability of ocean-going vessels on inland canals connecting the great lakes with tidewater found against the economical operation of such vessels on inland waters. The Roosevelt Commission in 1900 said, in speaking of the possibility of a canal connecting the ocean and the Great Lakes: "There are insuperable difficulties in the way of such canal ever being a success, no matter by whom constructed. It is intended to be used by vessels which can navigate the ocean, the canal and the lakes. 'WE DO NOT BELIEVE SUCH VESSELS CAN BE CONSTRUCTED SO AS TO BE ECONOMICALLY A COMMERCIAL SUCCESS.'"

BENEFIT MUST EQUAL OUTLAY

The report of the New York Commission also calls attention to a statement (not relating to this particular subject as a general proposition) in a bulletin of the Bureau of Foreign and Domestic Commerce, issued in 1918:

“Before recommending the construction of a new canal at a high cost, assurance must be given that the direct and indirect benefits to be derived are commensurate with the outlay required. It must also be demonstrated that the existing facilities are insufficient and cannot be made sufficient at a cost lower than for the proposed ship canal.”

And the question is asked if the improvement of our domestic waterways is to be further delayed while millions are to be expended in the construction of a ship canal down the St. Lawrence, “a project which has been repeatedly disapproved by Commissions and expert authorities in the United States?”

A most important feature of this project, viewed from this country's standpoint is the fact that for nine-tenths of the distance from Lake Ontario to the sea, the waterway is wholly within Canadian territory and under the control of Canada, e. g., the British Empire. The importance of this cannot be overlooked by this country. While now no one can foresee or reasonably expect that we shall ever be on other than the most friendly terms with our neighbor there may come a time when this might be a matter of serious concern.

The engineering features of the project; the expense of maintaining the canal estimated at \$6,000,000 annually; the increased burden of deepening the channels and the harbors of the lakes; the fact that vessels of a peculiar type would be required and that all such vessels would have to be constructed and that they would have to be adapted to bulk cargo carrying, as Mr. Harriman admits; are very important considerations to be taken into account in a final determination of this question.

THEORY VERSUS FACTS

The proponents of this measure all appear to be theoretical seamen. It would be more convincing if some practical steamship man would advocate the plan and say that it might reasonably be expected that the St. Lawrence route would be of economic value

to this country and that the project is practicable from an operating standpoint; that there would be inducements for practical steamship men to put vessels on the St. Lawrence route and that profitable operation is possible, explaining the basis on which such opinions are founded. So far, the record seems to be silent on this most vital point. The profitable operation of any vessel depends on a cargo in both directions. The writer recently inquired of an advocate of this construction (a gentleman identified with one of the organizations at the head of the lakes) what return cargo could be expected by steamers handling grain from Duluth to foreign ports. He replied, "General cargo — particularly coffee and bananas!" I asked him if he expected to export grain to Brazil; if he knew that bananas were handled in fast refrigerator vessels; if he knew that it is with the greatest difficulty that Boston is able to get an occasional coffee steamer notwithstanding Boston is a port of entry on a parity with New York for the entire interland of the United States? He apparently had no conception of ocean traffic but nevertheless thought it was entirely practicable to operate vessels profitably on the ocean-river-canal-lake route.

Now apparently Mr. Harriman has given this question of return cargo little thought for vessels carrying bulk cargo such as ores are not usually adapted to handle general cargo. General cargo vessels have one or more tween-decks and the bulk cargo is loaded in the hold, so that a ten thousand ton dead weight general cargo vessel would not handle 10,000 tons of grain but would handle considerable package freight, which does not load so heavy as grain. Possibly the eastbound cargo could be rounded out by cereals and lumber but what would such a vessel or even a bulk cargo vessel get for ballast on the return trip? Steamers must be properly loaded to operate with safety. They must be loaded down in the water by cargo or ballast. What would be the westbound cargo to do this, and on what routes would they operate 7 months in the year to get a cargo both ways, and where would they operate the other five? Could such vessels be reasonably sure of cargo when navigation on the St. Lawrence route is closed?

These may be considered objections raised for the purpose of defeating the project. Let any one who doubts their importance ask any steamship operator for his views on the subject and he

will soon find that this is not captious criticism. A better test would probably be to ask the fifteen western states if they will, as a condition to the construction of the canal, agree to underwrite the bonds of a company to be formed for the purpose of constructing the special type of ship which is obviously necessary for this route or the purchase of vessels of any type they consider practicable to handle the vast export tonnage which they so confidently expect would seek an outlet by the way of the St. Lawrence. If these states are sincere, they should not hesitate to do this since the Atlantic states would have to pay the greater part of the cost of construction, but does it not occur to the reader that these states are expecting something for nothing? The money which would be issued to finance the project would have to be raised by taxation, the majority of which would have to be paid by the states of New York, Pennsylvania and Massachusetts, which pay 43 per cent of all taxes; the state of Illinois pays only 8 per cent, and Minnesota less than $1\frac{1}{2}$ per cent, the remaining 13 states pay 21 per cent.

WHO WILL BENEFIT?

Again assuming for the sake of argument that the canal is practicable and that its navigation by vessels would be assured, who is to benefit by this great saving in transportation costs? Mr. Harriman has said that in a comparatively short time we shall not be exporting grain and grain products. Then what will the canal benefit us if this enormous tonnage which these western States produce will be consumed at home where most of it is consumed today. In the statistics which have been compiled by the advocates of the canal it is noticeable that they deal with production and not with exports.

It is claimed that the tonnage now handled on the lakes exceeds the tonnage of the combined movement through the Mediterranean and the Black Seas—granted that this is true. What is it? Where does it move? How much would be available for movement through the St. Lawrence?

Of the millions of tons in round figures, 60 per cent is iron ore from the head of the lakes to Lake Erie or Lake Michigan ports and 30 per cent coal handled on the reverse direction. The most ardent supporter of the canal project would be compelled to admit that none of this tonnage would be affected by the con-

struction of the canal. This tonnage is what makes it possible to operate boats so economically on the lakes—both directions loaded to capacity; modern handling devices and a quick turn around. But what about general cargo? When we come to examine the lake rates on this class of traffic, we are astonished to learn that with rates higher than ever before, the lake proportion on high class traffic approximating \$12 to \$15 per ton that the Great Lakes Transit Company found it unprofitable to engage in Lake Michigan traffic with Chicago, the New York of the west, as its western terminus. With the whole world to draw from through the Atlantic ports there apparently was not enough domestic or import traffic to encourage this line to continue in operation at rates lower than the lowest all rail charge.

THE WELLAND CANAL

Advocates of the St. Lawrence project also dwell upon the proposed improvement of the Welland Canal as if this were the key to the situation. Suppose that the canal and its locks are so improved that vessels drawing 26 feet can be accommodated that would still leave the lake ports and channels with a maximum depth of 21 feet, and no more accessible by vessels drawing over 18 feet loaded than they are today. The improvement of the Welland Canal is merely the mending of a link and will not affect the strength of the transportation chain from Duluth to the ocean until all the other links are likewise mended.

It must be apparent that the building of the canal will entail an expenditure of over 100 millions for the improvement of harbor and channels on the Great Lakes and impose additional fixed charges in the matter of upkeep as before mentioned. Even some of our Canadian friends have doubts as to the necessity for the Welland improvement as is indicated in an editorial from the *Ottawa Citizen*, which says:

“It is doubtful whether the New Welland Canal has any economic justification. Because the 600 foot freighters can be operated profitably between Cleveland and Duluth without any delay in the run excepting the one lock at Sault Ste Marie, and assured of full cargoes both going and returning, it does not follow that it will be likewise profitable to operate 600 foot freighters let alone ocean liners through the flights of locks between Montreal and the upper lakes.”

GRAIN EXPORTS

Mr. Winifred H. Schoff, an expert on this subject, in May, 1920, pointed out that the total export of grain from the United States is only a very small proportion of the crop. In 1913 it was for all ports 4,286,000 tons; 1916, 7,293,000 tons; 1918, 4,019,000 tons, and he said:

“It would seem to be a most liberal estimate that would assign much more than a million tons as the volume of American grain that could be attracted to a lake route for export.”

It must be remembered that this traffic would not move through one lake port or to one foreign destination. Therefore it would necessitate the establishment of a large number of ocean, canal and lake routes operating from various lake ports to many foreign ports, vessels of a peculiar type, yet to be constructed, which could be operated in this service only seven months in the year under the great handicaps previously referred to. Does it seem probable that this traffic would prove attractive enough to steamship owners and builders to insure the use of this route to an extent that would justify the enormous expenditure—with the probability of getting return cargoes of bananas and coffee from South and Central America?

The Hon. Lewis Nixon, a builder of ships, a gentleman of national reputation, after a careful survey of rates, cost of operation and other factors which bear financially on the operation of this route, has failed to find that it can be helpful in reducing transportation costs.

Mr. Adam E. Cornelius of Buffalo, who is a successful operator of lake vessels, has made a careful comparison of operating costs of lake and of ocean vessels and shows beyond question that ocean vessels cannot be operated economically on the lakes, because among other reasons terminals are constructed with reference to the particular type of vessel which has been found best suited to lake traffic. He also reaches the conclusion “that the ocean steamer because of its greater cost of construction and operation, cannot be depended upon to reduce the rates as they now exist from the Great Lakes to the sea. This conclusion was reached in 1920 when rates were higher than they have ever been in the history of this country. If those rates cannot be reduced how could it be expected that the more expensive type of ocean vessel

could compete successfully when conditions become more normal; as the conditions brought about by the great war are gradually overcome? This practical steamshipman realized that without imports the operation of vessels on the lakes is unlikely. This is what he has to say on that subject:

"I contend that the supply of ocean steamers on the Great Lakes would be limited by the few import cargoes that such steamers could locate in foreign ports or on the seaboard for delivery in bulk at such ports as Buffalo, Cleveland, Detroit, Chicago or Duluth. Inasmuch as the greatest density of the population of this country is along the Atlantic Seaboard such ports as New York, Boston, Philadelphia and Baltimore will always be the distributing ports for imports, and such being the case, it would be seldom indeed when a steamer of the ocean type could find a full cargo in foreign ports destined for any of the inland cities mentioned above. Of course, if the majority of import cargoes are destined for ports like New York, Boston, Philadelphia and Baltimore, it is not reasonable to suppose that such steamers would then proceed light hundreds of miles to the mouth of the St. Lawrence River and then on to the Great Lakes for some return cargo.

"If ocean steamers cannot be relied upon to secure import cargoes to the Great Lakes so as to connect with export cargoes of grain or other commodities for foreign ports and if, again, by reason of the increased cost of construction and operation they could not hope to reduce the present rates from ports like Duluth or Chicago to the sea, the St. Lawrence River project would be of little use to the United States."

The question arises "Are these practical steamship builders and operators better authority on the subject of water transportation and its cost than the theorists who arrive at a contrary conclusion and who are guided largely by what they wish to accomplish without having made any comprehensive study of the subject?" Careful consideration should be given to the fact that the West, which has fought the railroads to a standstill, sees an opportunity to divert its shipments to water lines and that those eastern interests who so loudly proclaim the transportation advantages to be gained are not interested in freight traffic, but

solely in the power development which might result. The cheap electrical power to be derived from this venture is the sop held out to the eastern States that would be adversely affected (assuming that the canal would do all claimed by its most ardent advocates), and here in New England are those who would sacrifice the port of Boston to secure cheap power.

The foregoing relates largely to foreign commerce transportation direct from lake port to foreign port. The position of Boston is that if the canal is constructed its foreign commerce will be destroyed assuming for the sake of argument that the canal will be used to the limit by ocean going vessels, but Mr. Harriman shows how this could be obviated and in reply to this criticism says:

“There is one further answer to this criticism. Much grain will pass down the St. Lawrence River in lake boats that are not seaworthy, as far as Halifax or Glace Bay, and there be discharged into elevators for reshipment; and boats leaving Boston for British points, can be stopping at those ports and without serious loss of time obtain bulk cargo, if the same is not available in Boston.”

This may seem to answer the criticism but who is going to operate lake boats to Glace Bay and return light 2,200 or even 1,500 miles for another cargo of grain? Who is going to build elevators of the type necessary for both loading and unloading vessels? Mr. Harriman should have inquired about the practicability of putting bottom cargo in a vessel after the top cargo is loaded and he might have gotten some information about the cost of making intermediate stops; their effect on the passenger business, and other minor details so important to the practical steamship man. What is suggested is not altogether impossible with some types of vessels, but loading the bottom cargo after the top cargo is loaded is considered a highly improper method of loading vessels. Steamship operators serving the Port of Boston say that this practice is altogether out of the question so far as Boston steamers are concerned, and that under no circumstances would passenger vessels make an intermediate stop after clearing from this port.

Anyone familiar with loading a vessel with grain would know that it is an extremely dirty operation and not performed while passengers are aboard and the bottom cargo must be loaded first to make the operation of the vessel safe. It is inconceivable

that any company operating vessels from the port of Boston would undertake the dangerous experiment of loading the upper cargo before the bottom cargo had been taken aboard. The safety of a vessel depends upon the way it is trimmed and the distribution of the load. It may seem quite possible to those who are not familiar with steamship operation to reverse the operation of loading, but steamship men take no stock in such recommendations.

Mr. Harriman correctly stated the facts when he said that bulk cargo was necessary for the development of the Port of Boston. He said that at a time when the St. Lawrence power development did not loom large on the horizon. The development of electrical energy on the St. Lawrence has no bearing on the proper loading of a vessel, and try as one may to make it appear that there is a possibility of developing foreign trade through Boston or other New England ports without the class of cargo which Mr. Harriman would divert to the all water route, it is entirely out of the question, and any practical steamship man knows that it is.

The first annual report of the Massachusetts Commission on Foreign and Domestic Commerce, signed by Mr. Harriman, and dated January, 1920, contains this statement:

"So keen is the Commission's appreciation of the benefits to New England's industries and commerce which would generally result from a proper expansion of steamship service from Boston that it considers essential the immediate inauguration of an aggressive movement to influence the flow of export freight through this port, and thus to render practicable the establishment of needed additional steamship lines.

"The production of New England alone, however, is not sufficient to justify the establishment of such services, and it will be necessary, in order to provide adequate freight, and especially bulk freight, for this purpose, to procure it from the Middle West and to some extent, perhaps, from Canada. This bulk freight can be secured only by the most aggressive action and actual solicitation of freight among the producers and shippers in the Middle West. The Commission is considering means by which this can be most effectively accomplished."

If Mr. Harriman was correct in the conclusion he reached in that report (and it is the opinion of those who are familiar with steamship operation that he was correct) then he is wrong in the stand that he now takes. It is very clear that Mr. Harriman considers the power development to be of first importance and transportation as a secondary consideration, but he is urging transportation development and putting that to the fore as an excuse for the development of power.

There are other economic questions to be considered. When navigation is closed by ice, exports will continue to move; they must move through some port and facilities must be maintained for their proper handling and care. The railroad terminals at Boston are now capable of accommodating a much greater quantity of freight than the port secures. Should our New England lines be required to maintain unused terminals at great expense during seven months of the year so as to help out our western marine friends when their ports are closed?

FIXING OF RATES

Another important matter to be considered is the provision of the Transportation Act which requires the Interstate Commerce Commission so to fix rates as to enable the carriers to earn a reasonable return on the property devoted to public use. Now if the opening of the St. Lawrence will enable the west to avoid the use of our railroads on this large volume of tonnage to be handled in ocean going vessels those who are still compelled to use rail transportation must make up for the loss. No one familiar with the act will question the correctness of this statement and it must be apparent that if this development will cut the bonds of railroad slavery which are now strangling the west, it is obvious that those bonds will be transferred to those who cannot take advantage of the St. Lawrence route. If the New England lines lose an appreciable amount of their import and export traffic, as well as an appreciable amount of their coal traffic, because it must not be assumed that the carriers will be the only ones to use this by-product electrical energy, then that loss must be made up by other traffic, which will have to pay the cost of changing from coal to electricity and for the enormously expensive equipment employed under that form of motive power.

DIFFICULT TO FINANCE

It is not likely that the roads could finance electrification on a large scale for they have consistently claimed for years they could not finance electrification in Metropolitan Boston, to say nothing of improving their antiquated freight terminals. What would be the value of the canal to New England if the New England roads lose a good part of their traffic to the canal and then find themselves too poor to electrify and unable to take advantage of this cheap power?

Mr. Hustis recently told the committee appointed by the New England governors that the electrification of the New Haven between New York and New Haven cost approximately \$15,000,000, and that the expected reduction in maintenance costs had not only not been realized but that the maintenance of the motor equipment exceeded the cost of steam equipment. Mr. Harriman says it would only be necessary to equip 1,500 miles of road in New England for electric service and this could be done for \$40,000,000. At the rate it cost the New Haven eight years or more ago when prices were measurably lower it would cost over \$300,000,000 but some will say it will not cost so much elsewhere in New England as at the New York end.

The terminals in and around Boston for a distance of 44 miles south and 30 miles west and north are if anything more complicated and located within the center of many towns and cities where the cost of installation would obviously be most expensive, but say we cut this cost in halves and make it 150 millions exclusive of motor equipment and then be liberal and reduce that amount $33\frac{1}{3}$ per cent, leaving the cost only 100 millions plus the cost of motor equipment which is modestly estimated at 40 millions more, where is this money coming from? Who is to furnish it to roads that are now begging for a temporary increase of 10 per cent in passenger and freight rates to be added to charges that are now so high that shippers can get freight transportation, say, between Lawrence and Boston, from store to store, cheaper than they can buy it from the Boston and Maine, from station to station.

The New England roads are now begging the public to stand between them and a receiver. They publicly proclaim their credit is impaired if not destroyed and yet Mr. Harriman who pretends to know something about transportation is advocating the diversion of traffic from them — in other words a reduction in gross revenue and huge capital expenditures as a remedy for their distress.

For years the people of Boston have been endeavoring to get rid of the antiquated freight terminals that require shippers to distribute their shipments not only through various freight houses but through hundreds of different doors of those houses and to obtain modern terminals (that would greatly reduce the carriers terminal costs) with the usual one dump delivery which is the rule very generally throughout the country and even at New York city, where piers of very limited capacity are of necessity used, but to no avail as the roads have repeatedly said they could not finance such improvements. Yet it is suggested in face of these conditions known to almost every layman that the modest sum of \$80,000,000 (a wholly too conservative estimate) be expended by these carriers in the conduct of an experiment in the use of electrical power that has failed to justify itself on the New Haven — according to the statement of Mr. Harris.

It is also argued that this improvement would make possible the development of considerable coastwise commerce between New England and lake ports — that grain would be brought to Boston and New England merchandise taken west. Generally speaking, New England merchandise is high class traffic that demands with few exceptions prompt transportation. The rail and lake service from New England is regular and shipments are forwarded several times weekly between Buffalo and Georgian Bay ports on the one hand and the western lake terminal on the other. In order to compete with this service, it would be necessary to have not less than two sailings a week from Boston and these vessels could not be expected to average more than ten knots an hour under economical operation, which would require ten days for the trip from Boston to Duluth. It would, therefore, be necessary to have a fleet of at least twelve vessels in continuous service to make this service attractive to the New England manufacturer, and this would mean a very large investment for the ships alone. The eastbound cargo would be confined almost exclusively to grain and grain products.

Copper is not brought to New England until after it passes through the refineries, which are located west of the Hudson river. In order to handle package freight, these vessels would have to be of the 'tweendeck type and this would preclude their economic operation as bulk cargo carriers in the ore business during the period of closed navigation as has been suggested. The amount of grain consumed in Boston is negligible when considered from

the standpoint of steamship tonnage. In the year 1920 there were less than two million bushels of all kinds of domestic grain received at Boston. During the year 1919 the receipts were slightly less than 1,300,000. These receipts are distributed according to the needs of the market over twelve months of the year.

The grain business is not conducted in New England in a manner that would permit of storing it in large quantities in Boston during the period of closed navigation, as anyone familiar with the grain market will readily understand. Of this 60,000 tons, only 35,000 would probably be moved during the season of open navigation and from this it will be seen that seven trips would take care of all of the grain if only 5,000 tons were carried each trip; but when this grain arrives at Boston, how is it to be handled?

There are no elevators at the port of Boston adapted to the unloading of vessels. Such as are here are constructed to unload grain from cars and to discharge it into vessels. The New Haven has no elevators, and therefore it would not be possible to deliver grain to the New Haven, even if other conditions were favorable, without the payment of a heavy switching charge from either the B. & M. or B. & A. terminals.

The three elevators at the Port of Boston are located 100 yards or more from the water front. To unload grain from steamers requires what is known as a marine leg to lift the grain from the hold of the steamer to the elevators. Elevators built to perform this service must be located on the water front and equipped so that one or more legs can be operated at the same time.

Before steamers carrying grain could be discharged at this port, the piers would have to be equipped with a large number of legs so that the steamers could be unloaded at any one of the piers where the vessels might berth. The present construction, as before stated, is for the movement of grain from elevators to steamers. To handle grain from steamers in the opposite direction it would also be necessary to belt it into the elevator which would require the adding of a reverse belt and this would necessitate practically the entire reconstruction of the present elevator gallery system. The elevators are now constructed to make larger deliveries to steamers and are only equipped with one loading spout from which out-bound cars can be loaded. The total capacity for loading cars out of the Hoosac elevator amounts to about ten cars per day. To increase this amount would require changing

over the interior arrangement of the elevators and a remodelling generally that would require a very large expenditure on the part of the carriers which, it must be perfectly obvious, they would not undertake.

The insurance charge at Mystic Elevator is \$2.77 per \$100. Hoosac \$1.93 and Boston & Albany 40c. At Georgian Bay ports the maximum charge is \$1.29 and only one elevator carries this rate. At three other elevators the charge is 20c and at one only 15c. Insurance at Buffalo is about the same as at Georgian Bay ports so that any grain that is brought to Boston for storage would pay a very much higher insurance charge while in elevators here than if stored at lake ports.

SHIPMENT TO INTERIOR

It would not be practicable to bring grain to Boston for shipment to the interior. The local rates from Boston, exclusive of insurance charges are so high that grain could be carried only a short distance when it would be met with a lower rate on business through Buffalo and Georgian Bay ports. Furthermore, no grain handled via the port of Boston would be entitled to milling in transit privileges — a matter of very great importance to New England.

Throughout New England there are millers who now enjoy uniform rates from the west to all New England territory irrespective of whether the grain originates in the western primary markets or at Buffalo or Georgian Bay. This grain for a nominal sum can be stopped at these mills and there converted into finished products and these products sent to destinations throughout New England at the same rate as the milled product from the point of origin to the final destination plus the nominal milling in transit charge. On short haul traffic from Boston to a point like Lawrence the grain would have to pay a local rate of about 13c per hundred and the mill product a local to destination — the minimum charge for which is about 10c per hundred and this would make a higher rate from Boston to a point 40 miles out than would apply from Buffalo to points in the State of Maine.

MUST REMODEL FACILITIES

The handling of grain from the west by steamer via Boston to New England destinations is wholly impracticable without the expenditure of large sums for the remodeling of terminal facil-

ities and a reconstruction of and reduction in the rates on grain from the seaboard so as to permit milling on the west bound traffic as is now permitted on east bound traffic and the water rate between Duluth and Boston would have to be made practically the same as from Duluth to Buffalo to encourage any substantial volume of tonnage via the St. Lawrence.

The Boston Chamber of Commerce for ten years has been making an earnest effort to secure the establishment of a steamship line between Boston and some gulf port where the volume of traffic is steady all the year around and is measurably greater than the volume that could be hoped to be developed for many years to come between New England and western lake ports. It has not been possible to interest capital in the establishment of such a line and it is inconceivable that capital would be attracted to such a roundabout route as the St. Lawrence with its dangers of navigation and impediments in the way of locks where the vessels could only be operated at the most, seven months in the year and would have to be used as tramp vessels during the remaining five months, with the probability of having to be tied up in the event of cargoes not being found.

When more profitable routes are neglected, by steamship interests, only by the exercise of the wildest imagination can anyone picture a fleet of coastwise vessels operating between any or all New England ports through the St. Lawrence Canal.

Mr. Harriman seems to have the impression that the development of the St. Lawrence is necessary for the operation of the Ogdensburgh route from interior New England. For many years the Rutland Transit Company operated a rail and lake differential route from Boston and New England points to the western lake ports by way of Ogdensburgh, where there are adequate terminal facilities at the present time for a lake line in connection with New England and connecting railroads.

The development of the St. Lawrence would in no way affect or benefit this route. The enlargement of the Welland Canal will however make possible the operation of larger boats between Ogdensburgh and Chicago than was the case when the Rutland Transit Company was being operated. Mr. Harriman minimizes the advantage of the Buffalo route and enlarges upon the advantage of the Ogdensburgh route and calls attention to a difference of approximately 200 miles in favor of the latter. The short

line distance from Boston to Buffalo is 480 miles. The short line to Ogdensburgh is 393 — a difference of 87 miles instead of 200 as he points out. The Rutland Transit Company notwithstanding the shorter rail haul always maintained the same through rates as the Canada and Atlantic route via Georgian Bay, where the rail distance from Boston is 710 miles.

It must be apparent that Mr. Harriman has in mind the moving of traffic from the interior of New England, not via Boston and the all water route from Boston to the west, but a rail and lake route via Ogdensburgh. Anyone who is familiar with the tonnage of Boston would realize that if all of one season's freight from Boston proper were concentrated and shipped at one time, it would probably not fully load more than two or three steamers and anyone who is familiar with coastwise tonnage would know that no coastwise general cargo line at present in existence operating between any ports in the United States operates on strictly port to port traffic, but draws from the interior at the port of loading and ships beyond the port of destination.

The successful operation of any water route from Boston to Lake ports would be dependent upon a very large volume of traffic moving from the interior to Boston. The development of the St. Lawrence is not necessary for the operation of a rail and lake line via Ogdensburgh and the Ogdensburgh route cannot be used as an argument for the development of water power on the St. Lawrence.

NOT PRACTICABLE

Is it at all reasonable to assume that traffic from interior New England could be handled by rail to Boston and then 2,500 miles over a restricted water route as cheaply as via Buffalo or Ogdensburgh with only a slightly longer rail haul and a much shorter water route—less than half as long—which is wholly unrestricted where the cargo is handled in the cheapest known type of vessel for economical operation? Mr. Harriman should know that no line could thrive between Boston and Lake Ports on Boston proper traffic, but would have to draw from the interior as do all coastwise lines, but apparently he has overlooked this.

To sum up the situation, Mr. Harriman's argument simmers down to this: "The canal should be constructed primarily as a power project."

His transportation argument is defective in many respects the chief of which may be summed up as follows:

1. The canal should be built because the western states want it, although the west, shortly after it is built, will not have any use for it.

2. That if Boston trans-Atlantic lines continue to serve Boston they will have to go to Glace Bay, where there are no elevators, or Halifax, where the elevators are not adapted to receive grain from Lake boats for their bottom cargo; but before any such arrangement could be carried out the terminals at these points would either have to be built or remodeled in the case of Halifax.

3. That there are no elevators at Glace Bay and those at Halifax would have to be rebuilt to handle cargo from lake boats as they are constructed much like the Boston elevators.

4. That this cargo will be taken to these ports by lake vessels which will go back in ballast, at least to Buffalo, when they might have made a round trip between lake ports loaded both ways while making the outward trip to Halifax.

5. That vessels can be built that can safely operate on the ocean-river-canal-like route but submits no evidence that will justify the belief that they will be built.

6. That notwithstanding all of the handicaps of navigation, the additional cost of insurance on which he does not touch; the extra time consumed in making the additional 4,400 miles of partially restricted navigation; the rate will be lower than now governs, though experienced steamship men state the contrary.

7. That the New England lines would find it profitable to lose their export traffic and part of the coal traffic to secure the electric power.

8. That it would be possible for the New England roads to finance 1,500 miles of electrification.

9. That coastwise-lake lines would be established from the New England coast to lake ports notwithstanding there are no terminal facilities on the New England coast for handling the only cargo freight the boats could secure east bound.

10. That the St. Lawrence development would result in interior New England business moving via Ogdensburg, a route that is now open if any one desires to operate boats from that port to western lake ports, but no one seems to have a desire to do so.

TRANSPORTATION DIFFICULTIES

Mr. Harriman has also failed to mention some of the fundamental transportation difficulties which are:

1. The requirements of the Transportation Act which would impose the loss caused by diverting this traffic from the rails to that which remained on the rails.

2. That no vessels could be economically operated on the St. Lawrence route light in one direction and no one has yet shown that westbound cargo could be obtained on any route that would take eastbound cargo.

3. That for ten years New England has been trying to get a Gulf line but can get no one to invest in it and that with appreciably less tonnage to the lakes it would be impossible to induce capital to invest in a lake-coastwise route.

4. That there are no terminal facilities in New England to unload grain from vessels and that the New England roads would hardly install facilities that would assist in reducing their earnings.

5. That in the present situation the New England roads could not provide these facilities if they desired to do so.

6. That the interior millers could not use all water grain in competition with ex-lake grain on account of the higher cost.

ISSUE BEFOGGED

The issue has been befogged to a very marked extent by the advocates of this project. Statistics about the tonnage of the Mediterranean and Black seas, the Suez and the productivity of the west have been cited time and again without the slightest analysis as to the probable amount of tonnage that would seek the St. Lawrence route. No parts of destination for eastbound cargo have been named and no serious consideration given to the kind of tonnage or its origin of the probably westbound movement. The present tonnage of the Great Lakes is of no value as an argument for this undertaking unless it is conclusively shown that it may reasonably be expected to move over the proposed route.

The west is undoubtedly sincere in its desire for this improvement, though it seems to have gone about getting it with a brass band and press agent rather than by the channel that a prudent investor would have chosen. We do not yet know whether the engineers will report favorably or what the estimated cost will

be; we do not know on what basis the expense will be divided or how the power will be allocated, but regardless of all this, the west is conducting an extensive propaganda in its behalf. Those who advocate it in New England do so from a very different standpoint. The west wants the transportation. It is not interested in the power project. In New England we cannot advocate the government building dams for power plants so we use the transportation argument as an excuse rather than as a reason for the expenditure.

The canal would not only be harmful to New England railroads but to all New England ports. The burden would fall heavily on New England manufacturers not only in the shape of government taxes but as transportation taxes also. As a transportation benefit to New England, the project stands as a wolf in sheep's clothing, and the sooner we realize this the better for New England.

This St. Lawrence project pill will have to be given a different coating before New England will swallow it.

APPENDIX C

Some Fallacies of the MacElwee - Ritter Book "Economic Aspects of the Great Lakes - St. Lawrence Ship Channel"

By GEORGE CLINTON, Jr. of Buffalo, New York

The work bearing the title quoted above, and which was but recently published, is a piece of special pleading on behalf of the proposed Great Lakes-St. Lawrence Canal, which, if it stood alone, would probably attract but little attention and require no answer, but taken as a part of the widespread and persistent propaganda now going on in favor of the canalization of the St. Lawrence, it has been given greater weight by the uninformed who have interested themselves in the subject than its contents merit, and it is, therefore, advisable that fallacies underlying the argument in it be exposed.

The work in question is wholly theoretical, is based upon selected statistics considered by the authors as suitable for their purposes, and such facts and figures as do not lend themselves to the argument in favor of the project are apparently ignored.

It is not within the scope of this paper to deal in detail with the authors' arguments, nor to criticise all of the data submitted by them in support of those arguments. To adopt that course would require a book as lengthy as the one under review and would result in an argument as theoretical and fanciful as the authors' own, a consummation to be carefully avoided. It will be sufficient to show that the facts contradict the authors' conclusions in several important particulars, constituting essential links of their chain of reasoning, thus vitiating their entire argument. By adopting this course it is not to be supposed that the remainder of their argument is conceded to be correct, but merely that any answer thereto is regarded as unnecessary.

Considering the book from the viewpoint thus outlined, we find that the most striking points in which the conclusions of the authors are demonstrably erroneous are those relating, first, to the character of the ocean vessels which would be able to navigate

the proposed channel and the Great Lakes; second, the cost of such navigation, and, third, the ability of such vessels to compete with present methods of lake transportation.

The authors' argument is based upon the following unwarranted assumptions, namely, that with a 25-foot channel provided from tidewater to the Great Lakes, ocean vessels of 25-foot draft, with a dead weight tonnage of 8,800 tons, would be able to reach the Great Lakes; that such vessels would be able to make the trip from Montreal to Duluth with a delay of only twelve and a half hours each way, due to narrow waters and lockage, and finally that such vessels could be operated at an expense which would enable them to compete with modern lake vessels on the Great Lakes and barges proceeding by way of the Erie Barge Canal or the existing St. Lawrence waterways. If any one of these assumptions is found to be false, the whole argument falls, and as it can be readily demonstrated that each of them is false the conclusion is by so much the stronger that the authors have been utterly unsuccessful in their attempt to show the practical value of the project.

Taking up the assumptions in the order in which they have been stated, we consider first the proposition that the 8,800 dead weight tonnage vessel could navigate the proposed 25-foot channel. It hardly requires argument to demonstrate the absurdity of this statement. It is a well-known fact that a steamer's propeller, as she moves through the water, throws out water from under her stern to an extent which increases as the vessel's speed increases, and that this condition is aggravated in narrow channels where the water has less opportunity to flow in from the bottom and sides to replace that which is thrown out by the wheel. Experience has demonstrated that even in wide waters a depth under the keel of at least 5 feet is required to enable a steamer to attain a speed of 12 miles per hour, which may be taken as the full speed of cargo carriers, both on the ocean and on the lakes, while in narrow waters, which term includes such channels as are proposed for the river sections of the St. Lawrence and such as now exist for long stretches in the St. Clair flats and St. Mary's River, safety requires a speed of not more than 9 miles per hour, while in the canal sections it has been found from actual operation that the average speed is about 4 miles per hour, exclusive of lockages. It follows as a necessary conclusion, therefore, that with the 25-foot channel, proposed, the draft practical

for use would be, not 25 feet, but about 20 feet, and that the tonnage of vessels in such a channel would be limited to about 4,000 tons gross, according to the statistics supplied by the authors of the work under consideration. We have not been favored with any computation of costs based upon vessels of this tonnage, and do not, therefore, know what would be claimed for them with respect to economy of operation, as compared with present methods, but, as we shall demonstrate that even the larger vessels which the authors assume will be able to navigate the proposed channel cannot successfully do so from the commercial viewpoint, it is unnecessary to enter fully on this phase of the argument. It is sufficient to say that for the purpose of enabling vessels of the draft and tonnage upon which the calculations of the book are based, it would unquestionably be necessary to provide a 30-foot channel from Montreal to Lake Ontario and to deepen the Welland Canal, the connecting waters of the Great Lakes and the lake harbors to a depth of 30 feet, all of which would involve an expense which has never been calculated, but which would run into the hundreds of millions.

If, however, the 30-foot channel should be provided, the character of ocean vessels which could navigate such a channel could not compete with present methods of transportation. There are many reasons for this, of which we shall allude to the more important. In the first place the cost of operation of such vessels is very much larger than the cost of operating lake vessels and barges, including transfers. MacElwee and Ritter have stated that they regard 25 per cent as a proper increase in the insurance rate. Direct information from underwriters' agents is to the effect that the proper addition to be made ranges from 120 per cent from the opening of navigation to the middle of October to 340 per cent to the close of navigation in November; that some companies will not insure at any rate. These facts, based upon actual experience, should settle the question as to the comparative safety and increased costs of the St. Lawrence route as compared with routes to more southerly Atlantic ports. It is stated in the book under review that the loss of time by reason of navigating in restricted waters, including canals, would be 12.6 hours each way. No basis for this statement is given. As a matter of fact there would be 15 locks over 60 miles of canal prism and 230 miles of restricted river channel to pass between Montreal and Duluth. Between Montreal and Chicago the lockages would

be reduced by 1 and the restricted channel by 63 miles. Experience at the Sault Canal has shown the average loss of time at the locks to be $1\frac{1}{2}$ hours, making a total of $22\frac{1}{2}$ hours on the Montreal-Duluth trip and 21 hours on the Montreal-Chicago trip. In addition to this there would be a loss of time in the canal sections of about 10 hours on an assumed speed of 4 miles per hour, which is the outside limit for those sections, and a loss of $6\frac{1}{2}$ hours in the restricted river channels at the maximum speed of 9 miles per hour on the Montreal-Duluth trip and of $4\frac{2}{3}$ on the Montreal-Chicago trip, a total loss to Duluth of 39 hours and to Chicago of $35\frac{2}{3}$ hours, which for the round trip must be doubled in each case. At 12 miles per hour this represents distances of 468 and 428 miles, respectively, instead of 120 miles, as stated by the authors.

The authors assume a crew for their typical ocean vessel which is about the same as that now employed on the average lake vessel. Where their information comes from is not stated. We are informed by vesselmen engaged in the ocean carrying business that the crew required by the ordinary ocean carrier is nearly double that required for the lake carrier of like cargo capacity, namely, in the proportion of 5 to 3. Furthermore, MacElwee and Ritter ignore completely the fact that the necessities of lake and river navigation have given rise to a special class of navigators who are in fact pilots and are licensed as such by the United States and Canadian governments; that the master of an ocean carrier would be incapable of navigating his vessel upon the Great Lakes, and, indeed, would not be permitted to do so, so that it would be necessary for each vessel when entering the Great Lakes to employ a pilot for each watch at an expense (if they could be procured at all for such service) of \$400 per month on the average, which is the prevailing rate for lake pilots. The same would be true with respect to the St. Lawrence. It would be necessary for a similar class of pilots to be developed for the navigation of the St. Lawrence, and their compensation would be an additional charge upon the ocean carrier attempting to navigate that river. At the present time both the Great Lakes and St. Lawrence pilots are the masters and mates of their vessels, and the charge for pilotage is, therefore, included in the wages of the crew. The men are given continuous employment while their vessels are in operation and are not under the necessity of seeking chance employment, with its attendant higher rates, which would be the case if they were dependent for employment

upon the arrival of ocean-going vessels at Montreal destined for ports on the Great Lakes.

No account is taken by MacElwee and Ritter of the largely increased hazard of collision and other sources of damage occasioned by the navigation of canals and narrow waters. It is a known fact that by far the largest proportion of collisions on the Great Lakes takes place in restricted channels, and this source of loss would be reflected in higher insurance rates. Insurance, however, would only partially cover the loss from this source, as it does not furnish protection against the delay occasioned by accidents, which loss must be provided against in freight rates, nor does it cover small losses below the deductible average, which, however, in such waters would, in the long run, amount to considerable sums.

Again, in comparing the cost of transportation on the Great Lakes and the St. Lawrence, as between lake and ocean vessels, the cost of construction of the assumed standard 5,500-ton ocean vessel is compared with that of a 10,000-ton lake vessel, and both costs are incorrectly given. The cost of the lake vessel is stated as \$1,100,000. In fact the present cost of construction of such a vessel is about \$400,000, or a little over one-third of the amount stated. The cost of the ocean carrier is said to be \$825,000, while in fact it would approximate a million. In calculating cost of transportation, therefore, interest on investment, depreciation and like items require adjustment in accordance with the true figures.

Applying the facts above stated it becomes manifest at once that the costs figured by MacElwee and Ritter are utterly unworthy of trust, thus reinforcing the conclusion that the most casual reader finds forced upon him by their statement that the cost of carriage from Liverpool to Lake Erie ports would be the same as to North Atlantic ports, namely, that their methods of reasoning are absurd.

The same looseness of statement is manifest throughout the book. For example, it is stated as a general economic rule that "It is a recognized rule of transportation that where there is a productive interior, ships will proceed as far inland as physically practicable and the farther inland they can penetrate, the greater is the resulting economy and the more extensive is the area benefited." There is no such rule. The fact is that ocean vessels will penetrate just so far inland, and no farther, as they can operate at a profit equal to or in excess of the profit obtainable

by them upon other routes of transportation which may be open to them. Thus they will not operate over routes where other methods of transportation are provided at lesser rates, nor will they operate over such routes if they can make greater earnings in some other trade. On both scores ocean vessels would not navigate the proposed St. Lawrence and Great Lakes route, because they could not meet the lake and barge costs of carriage and because the coastwise and trans-Atlantic trade gives them greater opportunities for profit.

The illustration of the Amazon navigation, used to exemplify the so-called rule, is peculiarly unfortunate. The Amazon, from Manaoas to its mouth, is virtually an arm of the sea, unsafe for navigation by barges. Ocean vessels can navigate this portion of the river with practically the same freedom as the open ocean, the river being miles in width as high as Manaoas and many times the depth required for the largest ocean vessels. From Manaoas, about 900 miles above the mouth of the river, to Iquitos there is an average depth of 120 feet, and the largest ocean vessels can navigate the river throughout the entire distance of 2,300 miles to the heart of the rubber district. If the "economic rule" stated above were correct we should expect to see ocean vessels in the foreign trade proceeding the whole distance to Iquitos. As a matter of fact they stop at Manaoas, 1,400 miles below that point, which is used as a depot for the receipt and transfer of the products of the interior. The navigation of the upper river is carried on by river steamers especially adapted to that service. Thus, instead of proceeding as far inland as is physically possible the ocean-going vessels, which are of small tonnage, fully capable of traversing the upper reaches of the river, stop about two-fifths of the navigable distance from the mouth of the river.

In conclusion, it is established that the work under consideration is so entirely theoretical as to be of no practical value in arriving at a conclusion as to the desirability of the proposed waterway; that the reasoning is based upon utterly wrong premises as to the character of vessels expected to use the route and as to comparative costs of operation and that the self-styled specialists who are responsible for the book deal in economic rules evolved from their own imagination that have no actual foundation in fact.

The elaborate calculation built upon the foundation of erroneous premises of fact and theory is a structure erected on shifting sand, which cannot stand the test of examination.

APPENDIX D

In the Matter of an Investigation Conducted by the International Joint Commission, Sitting at Montreal on October 8th and 9th, 1920, on Certain Questions Relating to the Deepening of the Waterways of the St. Lawrence River between Lake Ontario and Montreal

MEMORANDUM PREPARED BY THE SHIPPING FEDERATION OF CANADA (INCORPORATED) AGAINST THE ADOPTION OF THE PROPOSED SCHEME

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- (1) Memorandum re water power on the St. Lawrence and Ottawa Rivers.
- (2) Water power possibilities on the Georgian Bay Canal.
- (3) Statement of Sir Adam Beck, of the Ontario Hydro-Commission, on the possibilities of the Ottawa River for power development.
- (4) Discussion of Mr. Holgate's paper on "The Upper St. Lawrence River," by Mr. W. F. Tye, C. E., of Toronto.
- (5) Statement of traffic on the Sault Canal during the season of 1918 and percentage of traffic.
- (6) Statement of the highest and lowest water in the harbor of Montreal for the years 1903 to September 30, 1920.
- (7) Extract from reports of Messrs. Arthur Surveyor, C. E., W. J. Francis, C. E., and Prof. C. H. McLeod, C. E., on the water levels of the River St. Lawrence.
- (8) Extract from report of International Waterways Commission (1910) on the levels of Lake Ontario.

IN THE MATTER OF AN INVESTIGATION CONDUCTED BY THE
INTERNATIONAL JOINT COMMISSION, SITTING AT MONTREAL
ON OCTOBER 8 AND 9, 1920, ON CERTAIN QUESTIONS RELATING
TO THE DEEPENING OF THE WATERWAYS ON THE ST. LAW-
RENCE RIVER BETWEEN LAKE ONTARIO AND MONTREAL

Memorandum submitted by The Shipping Federation of Canada, a body incorporated by the Parliament of the Dominion of Canada, whose main object is to safeguard the interests of navigation, more especially of the St. Lawrence, and whose President and members are representatives of the principal lines trading to the Atlantic, South African, West Indian, South American, East Indian, Australian, New Zealand and Mediterranean ports from the St. Lawrence, and also of the coasting lines trading between Nova Scotia, Newfoundland and St. Lawrence.

The question of the proposed deepening of the waterways on the St. Lawrence River between Montreal and Lake Ontario has been given careful consideration by the Federation and its members, and it was unanimously decided to go on record as being opposed to the proposed scheme for the following reasons, which are given herewith in brief.

(1) Navigation interests on the St. Lawrence require all the depth of water available between Montreal and the sea, and if dams and power plants are constructed in conjunction with the proposed system of deep waterways there may be a tendency to store up water during the off-peak hours which might cause dangerous fluctuations of the water levels of the river below Montreal. The flow of the river is now regulated by nature, and navigation interests do not desire to have this replaced by artificial control for power purposes as the predominant factor.

(2) No well defined plan having yet been put before the public for consideration, and until such a scheme is submitted, with full report and plans, we must protest against work of any kind being done. In submitting our protest, we have to further say that the entire scheme of the so-called deep waterways system, and the results which it is hoped to get from it, is not an economically sound proposition from a commercial standpoint.

The cost we believe to be greatly underestimated. For a 20-foot canal it was variously considered that \$150,000,000 would build a 20-foot waterway from Montreal to Port Colborne, divided:

\$50,000,000 for the Welland, and
\$100,000,000 for the St. Lawrence Canals.

Welland has already spent, we understand, \$50,000,000, and is yet uncompleted, and it is doubted whether this work can be finished under a total cost of \$100,000,000.

Estimate for the St. Lawrence Canals, for which original estimate of \$100,000,000 was given, has now been increased to approximately \$120,000,000 in various reports which we have seen, but in the light of the work which has been done on the Welland Canal it is safe to estimate that the St. Lawrence would cost probably \$200,000,000, and then only for a 20-foot channel.

If, as is strongly hoped for by some of the lake ports, vessels of 30-foot draft will navigate in the future from Montreal to the head of the lakes, the cost of the canals would be enormous; we are afraid to give an estimate, as in all works of this kind the greater the depth the greater the multiple of cost; for not only would the St. Lawrence Canals have to be built, but the waterway or approaches to the canals would also have to be deepened, which in all probability would mean a dredged channel from Montreal to Lake Ontario and again up the Detroit and St. Clair Rivers, and the rebuilding of the Welland and Sault Ste. Marie Canals to 30 feet.

It is not an economical transportation question. Trade, like water, seeks its own level. The reason today why steamers make their terminus at the various Atlantic ports, including Montreal, is on account of the unobstructed navigation. As soon as you have obstructed navigation, such as with canal locks, you immediately increase the cost of transportation. From an economical point of view it is improbable that ocean-going vessels will ever make a practice of trading to ports on the Great Lakes, no matter to what extent the canal systems west of Montreal are enlarged and deepened, as the cost of upkeep of an ocean steamer, the delays of proceeding through the canals, and the danger of damage, would be too great to make them a revenue paying proposition. Ocean vessels are designed for use in waters of great depth and unlimited width, which they navigate with unrestricted speed and comparative safety, but on rivers, canals and other contracted waters they must materially reduce speed, and frequently require the assistance of tugs. Furthermore, vessels constructed for ocean service are designed to give the maximum stability and stiffness to resist the severest weather and wave action, while vessels plying on the Great Lakes are of lighter construction, fitting them for the lake trade. It will, therefore,

be realized that vessels built for the ocean trade could not be used economically in the lake trade, while vessels constructed for the lake trade would be unsuitable for the ocean trade by reason of their lighter construction. The most economical manner to handle freight between Montreal and the west is to continue, as has been done in the past, the building of lake vessels at much cheaper cost to suit the canals for carrying cargoes on the inland waters and transfer to or from the ocean steamer at the seaport.

When we read in speeches of such men as the secretary of the Illinois Manufacturers' Association that they will see deep draft ocean liners from Seattle, Vancouver, San Francisco, Vladivostok, Yokohama and other oriental ports sailing up the St. Lawrence through the canals to Chicago, it almost makes you think that they have lost their senses in the west. A glance at the map, showing the roundabout voyage a vessel would have to take should make a man hesitate before voicing such statements. While it may not be impossible, it is nevertheless true that it is impracticable and unsound economically.

(3) We cannot too strongly protest against interference with the St. Lawrence waterway. The St. Lawrence drains nearly half the North American continent, including all that territory between the watershed of Hudson's Bay and the Mississippi River.

The St. Lawrence River is noted for the fact that it never overflows its banks, it is sufficiently large to take care of the freshets and floods created by ice jams which are purely local in character, but if dams are built in the river without the necessary data beforehand to work upon regarding conditions of the movement of the ice in the spring and fall, very serious conditions might arise, and the river, which has up to the present been able to take care of the flow of water through it, might be found to flood its banks and immense damage be the result.

It has been stated that these improvements to navigation are also to develop electrical power along the route. Care must be taken that this electrical power is not for any private or personal corporation. At the Long Sault a company owns 3,700 acres on the United States side and over 300 acres on the Canada side, or a total of over 4,000 acres, so that they probably control both sides of the rapids at the most advantageous points.

It is felt that the scheme which has been proposed emanates from private companies, who are simply seeking to create large

water powers, the scheme providing for the erection of high-level dams in the international portion of the St. Lawrence with a view to the utmost power development; and there is reason to fear that, in the diversity of interests, the navigation interests of the St. Lawrence may suffer through control of the water to suit power users.

(4) Another important point which must be considered is the flow of water through the St. Lawrence. Already, owing to the action of the Chicago Drainage Canal, it is reported (according to reports made by Messrs. McLeod, Francis and Surveyor, three noted hydraulic engineers) that water in the St. Lawrence has been reduced by 6.3 inches. The Chicago Drainage Commission are desirous of increasing the flow of water from Lake Michigan into the Mississippi, and in the late session of the Association of Port Authorities at Chicago it was publicly proclaimed that they look forward to the time when they will have navigation from the Mississippi up the Illinois River and Chicago Canal to Chicago, both bringing up the products of the south and exporting from Chicago the products of that city in competition with the development of St. Louis.

How can they secure this navigation except by taking additional water from Lake Michigan? By taking further water from Lake Michigan they also take water from the St. Lawrence, thus requiring further excavation of the St. Lawrence Canals and channels, and also at the various lake ports. They would defeat, as it were, with the excavation of the Chicago Canal, on the one hand, the navigation which they so dearly wish to get on the other through the St. Lawrence.

(5) In the report of the International Waterways Commission on the regulation of Lake Erie (1910), on pages 83 and 84, paragraphs 153, 154 and 155, the Commission states that "to regulate the levels of Lake Ontario would cause higher water in the first part and lower water in the last part of the navigation season on the St. Lawrence canals. Such results would injuriously affect navigation."

(6) We are opposed to canals being built internationally. The canals in Canada should be built and owned by the Dominion government; there should be no international system of canals in Canada which the Dominion government do not absolutely control.

In the scheme, we understand, that along the Long Sault Rapids the canal would be constructed on the southern side of

the river. This would mean that eventually a canal on the northern side of the river would have to be built by Canada in a similar manner to the canal she had to build at Sault Ste. Marie. In addition to the cost to Canada of these canals, she would have to bear the entire cost east of the boundary line. In other words, we are already contributing to the cost of the Welland Canal to 25 feet, and would have to build a canal on our own side of the Long Sault and the St. Lawrence Canals, as well as reconstruct the Welland and Sault Ste. Marie Canals to 30 feet, as mentioned in a previous paragraph.

Electrically, what would Canada benefit? She would get 50 per cent of the power developed at the Longue Sault at the eastern end of Ontario, where she has immense water power in the middle of Ontario awaiting development, of which she would have the entire product, and that in the neighborhood where the power could be delivered to the consumers at cheaper cost.

In other words, this great development which has been proposed is one which would vastly more benefit the United States than it would Canada, and very close consideration must be given to the project before the Canadian government becomes a party to it. Rather it would be better for the Dominion government, before a scheme to deepen the St. Lawrence waterways is adopted, to give consideration to the proposed Georgian Bay Canal, which is the most advantageous route for Canada to construct. The advantages of this route are many, the principal ones being that the proposed route would be entirely in Canadian territory. The distance is shorter, the cost of construction less, it borders the two provinces of Ontario and Quebec, and would develop new territory and resources in both, including immense water powers, the electric product of which would be distributed over the two provinces at the lowest cost.

(7) Another point must not be lost sight of, and that is that all this work would require remedial work below the city of Montreal to safeguard the St. Lawrence below this point.

We have stated at the beginning of our remarks that trade, like water, seeks its level. Remedial works in the St. Lawrence below Montreal might be the means of stopping vessels at Quebec, for the very simple reason that navigation in the St. Lawrence above Quebec would be slower and more difficult than it is today.

(8) Another point which the would-be beneficiaries of this scheme overlook is that the St. Lawrence navigation in the spring

of the year would likely be opened two or three weeks later than at present on account of the ice not being able to move out by natural causes; naturally if it were held back by dams it would have to melt instead of moving out as it does now in a series of shoves. How much longer the ice would take to clear the St. Lawrence no one can tell, but it is a dangerous thing to interfere with nature which at present serves us so well. It might be the means of diverting a large part of our St. Lawrence commerce to the United States ports, and we believe in the motto, "Hands off the St. Lawrence River."

(9) Finally, would it not be judicious for Canada, before entering into any international agreement with the United States about building canals, or improving our waterways, to require first that the United States government should compel the Chicago Drainage Canal Commission to fulfill their obligations and reduce the flow of water through the canal? An agreement was entered into with the Washington government as to the flow of water, and other works to be carried out on the Drainage Canal, but still the Chicago Drainage Canal has gone on increasing the water supply through the canal until it is interfering with the levels of the St. Lawrence River. (See Report of the Secretary of War for the United States, dated 13th January, 1913, pages 6 and 11.)

(10) In conclusion, the Federation is of the opinion that our finances want careful study before fresh obligations are entered into which would involve this country in the expenditure of millions of money, and this unremunerative money, as canals along the border are free, so that the expenditure must be carried by the people already heavily taxed. Therefore, the Federation is further of the opinion that any project for canalization extensions should be subject to extremely close scrutiny and all alternative routes should be carefully considered before any action is taken.

The whole most respectfully submitted.

Montreal, October 7, 1920.

(Signed)	R. W. REDFORD, <i>President.</i>
(Signed)	THOMAS ROBB, <i>Secretary.</i>

APPENDIX No. 1

(Accompanying Memorandum of Shipping Federation of Canada)

MEMORANDUM RE WATER POWER ON THE ST. LAWRENCE AND
OTTAWA RIVERS

From the point of view of development of water power, the St. Lawrence improvement chiefly interests the United States. Canada has an independent source of enormous power in the Ottawa river.

The United States interest centres in the power at the Long Sault, where an American Company has already expended two or three million dollars in acquiring land, etc.

On the Ontario side there is only a strip of 20 to 25 miles in width from Cornwall to Brockville which cannot be more easily supplied with power from the Ottawa river — and every foot of this strip is at a distance of from 25 to 70 miles from important sources of power on the Ottawa, any or all of which can be developed more cheaply than the Long Sault power, and are free from international problems.

No industry of any consequence in this territory either obtains its raw materials or markets its products locally.

A dam was built several years ago at High Falls on the Lievre river, 20 miles north of Buckingham, to develop 28,000 to 30,000 horsepower. There has been no electric installation made.

The Riordan organization are proceeding to develop about 50,000 horsepower on the Gatineau about six miles from Ottawa.

A portion of the Cedar Rapids power is already being exported to the United States.

In a recent number of Conservation there appeared a description of a super power scheme for supplying American cities in the Atlantic Coast district, and apparently it is anticipated that the entire Long Sault power will be available for this project. Once we let Canada's share of this power go to the United States, it will never come back.

Surveys now being made contemplate raising the river at the Long Sault to the Lake Ontario level. This plan is being advocated in the United States, but involves enormous damages from flooding.

	El. H. P.	Miles	Miles	Miles	Miles
Point Fortune	148,000	42	62	85	97
Hawkesbury	71,800	42	58	81	93
Ottawa, additional.....	45,000	55	43	54	62
Chats Falls	113,500	81	67	64	67
Portage du Fort.....	68,300	104	90	87	90

Distances from	Corn- wall	Morris- burg	Pres- cott	Brock- ville
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(Scales from map of Ottawa watershed accompanying Georgian Bay Canal Report.)

(Accompanying Memorandum of Shipping Federation of Canada)

One of the strongest features connected with the development of 1,000,000 horsepower of water power by the Georgian Bay canal is that the whole route is in strictly national waters. We are perfectly free to develop, regulate and control this enormous power as we may see fit in the interest of Canadian industry and commerce. And it is situated in the heart of the country, convenient to both raw materials and markets, and where it will equally benefit the two great provinces of Ontario and Quebec.

The plans proposed create at least twelve powers which consume the entire head of the Ottawa river from Mattawa to the Lake of the Two Mountains.

Upwards of 1,000,000 horsepower can be developed by the improved regulated conditions proposed for canal purposes.

The construction of the canal will furnish one of the principal reasons for the development of the powers by giving cheap transportation both for the raw material and the finished product.

These powers by reason of the canal construction and the storage created at the headwaters, form one of the chief features in the building of the canal and would ultimately go a long way towards paying interest on the total cost of construction.

By the plans for the waterway the flow with the proposed storage, will be augmented at low water season, the number of available sites for power increased, and dams constructed which are in themselves the most expensive part of the power development. But these dams are larger than a power company would undertake for development purposes only. Therefore it is clear that ultimately owing to the construction work the energy available will be from 15 to 20 times more valuable than it is now.

An annual rental of \$5 per horsepower would result in an eventual revenue of \$5,000,000 per annum.

North of the Island of Montreal, on the Back river route, there will be developed at two sites, 148,480 electrical horsepower.

At Hawkesbury, 60 miles from Montreal there will be developed 71,000 horsepower.

At Point Fortune, 50 miles from Montreal 148,000 electrical horsepower.

At the Chaudiere, 127 miles from Montreal, 45,000 additional horsepower will be available after the canal is constructed.

At the Chats Falls, 1755 miles from Montreal, 13,500 horsepower will be available.

At Portage du Fort, 174 miles from Montreal, 68,300 horsepower will be developed.

At Rocher Fendu, 183 miles from Montreal, 78,000 horsepower.

At Grand Calumet Falls, 56,000 horsepower.

At Paquette, 209 miles from Montreal, 24,900 horsepower.

At Des Joachims, 266 miles from Montreal, 60,400 horsepower.

At Rocher Capitaine, 204 miles from Montreal, 82,000 horsepower.

At Deux Rivieres, 296 miles from Montreal, 82,000 horsepower.

These four powers aggregating 446,600 horsepower are all within easy transmission distance of points along the St. Lawrence.

APPENDIX No. 3

(Accompanying Memorandum of Shipping Federation of Canada)

STATEMENT OF SIR ADAM BECK, CHAIRMAN OF THE HYDRO
COMMISSION OF ONTARIO ON THE POSSIBILITIES OF THE
OTTAWA RIVER FOR POWER DEVELOPMENT.

Before the Railway Committee of the House of Commons, in 1912, Sir Adam Beck said:

“The Ottawa river must be the backbone of the supply of electricity to the Province of Ontario. We are limited on the St. Lawrence by treaty obligations, and we must depend on one great source of supply, the Ottawa.”

APPENDIX No. 4

(Accompanying Memorandum of Shipping Federation of Canada)

EXTRACT FROM DISCUSSION ON MR. HOLGATE'S PAPER "THE
UPPER ST. LAWRENCE RIVER, ETC.," BY MR. W. P. TYE, C. E.

I have read Mr. Holgate's paper with a very great deal of interest, and believe that a thorough and critical survey and examination should be made of the St. Lawrence river. It is not, however, necessary that this examination delay the commencement of the construction of the Georgian Bay canal.

I believe that the Georgian Bay canal should be built for reasons entirely separate and distinct from those which govern the St. Lawrence river.

I believe that in deciding on the improvement of the St. Lawrence, of the construction of the Georgian Bay canal, there are two distinct ends which should be taken into consideration.

As a transportation route pure and simple, I believe that a railway across Ontario from Montreal to Midland via Ottawa offers a much cheaper and better solution than does either the Georgian Bay canal or the improvement of the St. Lawrence river. The cost in the first place would be very much less. The estimated cost via Georgian Bay canal is \$100,000,000. This is very likely to run to \$125,000,000 or possibly \$150,000,000 before it is completed. I do not believe that simply enlarging or rebuilding the Welland canal to 22 feet draft would be sufficient for the St. Lawrence route. The St. Lawrence canals should also be deepened. Those two would run into a very large amount

of money indeed — at least twice what a double track railway with 0.3 per cent east bound and 0.5 per cent west bound grades would cost. And when the interest on the cost of construction and the maintenance of the canal were taken into consideration I am confident that the railroad would be found more economical. And if it is simply as a matter of transportation, then I believe not only should the St. Lawrence route be thoroughly investigated but the railway should also be surveyed and estimated on.

I think, however, to Canada the question of the development of power will, perhaps not in the immediate future, but in the years to come, be even more important than the transportation question, great as that is. My reasons for thinking so are as follows:

Americans have been most extravagant and wasteful in the use or rather the abuse of their natural resources. There was in the great Appalachian basin sufficient fuel to have lasted the whole world for generations, but with the extravagant methods which have prevailed, this fuel is within measurable distance of being exhausted. It is estimated by the United States Geological Survey that for every ton of coal mined in the United States at least one and a half tons have been left in the ground. This it will be practically impossible to recover at any reasonable cost. In addition to that, the easiest mined seams have been worked first. These are frequently the underlying seams — so that the disturbance in the ground caused by the working of these underlying seams, has in a great measure destroyed the roof and floor of the upper seams, making their recovery a matter of great difficulty and cost. While the waste in coal has been fabulous it cannot in any measure be compared to the waste in natural gas. The natural gas fuel of the Appalachian Basin at one time exceeded in heating values the enormous deposit of coal, but it has simply been allowed to waste at the rate of hundreds of millions of cubic feet daily until it is to a great extent exhausted. So that the great supply of coal gas and oil fuel of Pennsylvania, and I may add the whole of the United States, is within a measurable period of exhaustion. Some authorities estimate that the coal will not last over one hundred years. The high grade iron ores of the United States are also being rapidly exhausted. Dr. Allerton I. Cushman, Director of the Bureau of the Industrial Research at Washington, estimates that these high grade ores will be exhausted within thirty years.

With the rapid depletion of the high grade iron ores, and the increase in the cost of coal which must come from the great waste and rapid exhaustion of the easily mined high grade seams, the

great advantages possessed by Pittsburgh and the Ohio valley as a manufacturing centre will disappear. With the disappearance of the great advantage now enjoyed by Pittsburgh will come Canada's great opportunity.

The construction of the Georgian Bay canal will develop a very large amount of water power. It is conservatively estimated that the Ottawa and its tributaries will give 3,000,000 horsepower equivalent in power requirements to the mining of 40,000,000 tons of coal per annum. This water power, unlike coal, can never be exhausted, and with the rapid depletion of the coal and iron in the United States, and with the enormous horsepower of the Ottawa and its tributaries and the low grade iron ores of the Ottawa valley, it is easily possible that in years to come the great manufacturing centre of this continent may be transferred from the Ohio valley to the Ottawa valley. There is no reason why it should not if the people of Canada have the enterprise to make it so. For such reasons as this I believe that the construction of the Georgian Bay canal is a national necessity. I do not mean to say that the construction of the Georgian Bay canal will at once transform the Ottawa valley into a great manufacturing centre but it will make it possible as with abundance of iron ore, abundance of the cheapest and best power in the world with a deep draft canal permitting ocean freighter to penetrate into the heart of the Ottawa valley, there seems to be no reason why it should not become in time as great a manufacturing district as any in the world.

It may justly be argued that the same thing applies to the St. Lawrence valley, that the St. Lawrence itself will produce as much or more power than will the Ottawa and its tributaries, but the development of power does not seem quite as important to Canada as it does in the Ottawa, as at least half of this power will belong to the United States.

Notwithstanding all of this, I believe that a survey and close examination should be made of the St. Lawrence river in order that our legislators and others may have a correct understanding of the problems.

The question of power development at the Long Sault has recently been agitating the country, and no one, with the exception of possibly men like Mr. John Kennedy, who has given a life long study to the question, could say whether this was a proper development to be permitted or not. If the question of the regulation and development of the St. Lawrence had been thoroughly

gone into it would then be an easy matter to say whether such power development should be permitted or not. If it fitted in with the general scheme evolved by close study of the river, then unquestionably it should be allowed. If not, it should not for a moment be tolerated.

People talk lightly of the conservation of power. There is no such thing as "conservation of power," as water that has once run down hill can never again be used for power production. But there is, however, such a thing as intelligent use, and with the enormous power which may be developed from the St. Lawrence river, and with its exceeding importance to Canada as a navigable channel, it unquestionably should be thoroughly studied.

APPENDIX No. 5

(Accompanying Memorandum of Shipping Federation of Canada)

STATEMENT OF TRAFFIC ON THE SAULT CANAL, SEASON 1918, INCLUDING CANADIAN AND UNITED STATES CANALS

Only a small percentage of the Sault traffic will ever use the St. Lawrence canals, no matter what depth.

Freight earnings and tonnage as basis of comparison of importance of traffic:

	Tons	Freight Earnings	Per Cent
Iron Ore	60,551,296	\$60,551,296	72.51
Coal	19,981,610	8,631,173	10.34
Wheat	3,681,544	5,646,035	6.76
Flour	822,884	3,373,826	4.04
Lumber	510,912	1,662,746	2.00
Other Grains	695,649	1,416,829	1.70
Merchandise	494,437	1,236,093	1.48
Oil	334,134	334,134	0.40
Stone	402,009	301,507	0.36
Copper	86,078	172,156	0.20
Salt	81,007	105,309	0.12
Mfd. Iron and Steel	38,767	77,534	0.09
	<u>85,680,327</u>	<u>\$83,507,638</u>	<u>100.00</u>

(From Statistical Report of Lake Commerce through Sault Canal, 1918.)

APPENDIX No. 6

(Accompanying Memorandum of Shipping Federation of Canada)

STATEMENT OF HIGHEST AND LOWEST WATER IN THE HARBOR OF MONTREAL FOR YEARS 1903 TO 1920, INCLUSIVE

MONTH	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920
May.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....
June.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....
July.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....
August.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....
September.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....
October.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....
November.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....	Highest..... Lowest.....

APPENDIX No. 7

(Accompanying Memorandum of Shipping Federation of Canada)

EXTRACT FROM REPORTS OF MESSRS. ARTHUR SURVEYOR, C. E.
W. J. FRANCIS, C. E. AND PROF. C. H. McLEOD, C. E. ON
THE WATER LEVELS OF THE RIVER ST. LAWRENCE

Mr. Arthur Surveyor, C. E.:

"Messrs. Haskell, Forneret and Stewart attribute the loss of level to two principal causes, the dredging of the ship channel and the diversion of 8,000 cubic feet per second from Lake Michigan by the Chicago Drainage Canal. These points are discussed as follows on page 13 of their report:

The Chicago Diversion has lowered the water in Montreal harbor 3.4 inches, determined as follows:

Gauge Height: Lanoraie.	Gauge Height: Montreal	Discharge
14.19	20.45	292,500
15.54	21.88	333,000

so that the increment is 28,300 c. f. c. and for a diversion of 8,000 cubic feet the loss of level is 3.4 inches. The loss, therefore, to the harbor from dredging is 2.4 feet. It is possible that there may be a further small loss as a result of deforestation, but as both Lake St. Louis and the lower river are affected by this, your commissioners are unable to determine its amount."

It would appear from this quotation that the damage caused by the Chicago Drainage Canal diversion has been very small when compared with the loss of level chargeable to the dredging when it comes to a question of remedial works, this is not a very important matter as the full depth lost must be recovered irrespective of causes. However, this report is an official document issued by one of the departments forming the Federal administration and if its contents were allowed to remain unchallenged or uncontradicted they might be used as an argument in favor of a greater diversion of water at Chicago.

The writer cannot concur in the findings of the Commissioners touching the lowerings of the Montreal Harbor levels by the Chicago Drainage Diversion for two principal reasons.

The Commissioners' computations are based on the discharge of the St. Lawrence river taken at Lanoraie, that is to say below the points of confluence of the Back river, the l'Assomption and

the Mille Isles rivers; this discharge is much larger than the flow opposite Montreal, so that the figures given are out by a good margin; taking up the respective discharges at Lanoraie and at Montreal at the elevations given we have the following table:

Gauge Height Lanoraie	Gauge Height Montreal	Discharge Lanoraie	Discharge Montreal
15.54	21.88	333,000	277,500
14.19	20.45	292,500	255,500
	1.43	40,500	22,000

The increment per foot of 28,300 c. f. s. found by the Commissioners by using the Lanoraie discharge is in reality 15,400 c. f. s., when the Montreal discharge is used, so that a diversion of 8,000 c. f. s. represents a loss of level of 6.3 inches of the figure 3.4 inches given.

It will be noted also that the effect of the Chicago Drainage Canal diversion is calculated by the Commissioners for a certain stage of the river between elevation 20.45 and 21.88, that is to say, practically at elevation 21.16; this corresponds to the average August level for the period between 1907 and 1911, and is practically 3½ feet above low water. It will be shown later that the effect of the diversion of water on the level of Montreal harbor is felt much more severely at low water stage so that the effect on all stages of the river should have been given. The writer, by using the discharge measurements made by the Public Works Department in the seasons of 1910, 1911 and 1912, at Lanoraie, at Point aux Trembles, at Cedars and on the Ottawa river, has succeeded in plotting a curve of the discharge opposite Montreal referred to the lower Lachine guage. This curve can be used to estimate within reasonable approximation the loss of level in Montreal harbor, due to a given diversion of water. The formula for this curve has calculated and is of the form $Q = I - bh - ch^2$, in which "Q" is the discharge in cubic feet per second corresponding to a water elevation of "h" feet, registered at the Lachine guage.

"a," "b" and "c" are the constants or parameters of this equation and have in this case the following value:

"a" = 293,970.

"b" = 18,888.

"c" = 834.

The equation of the discharge of the St. Lawrence river in Montreal harbor is therefore: Q in c. f. s. = $293,970 - 18,888 + 834 h^2$.

The following table has been prepared to show the effect of diversions of 8,000, 10,000 and 14,000 cubic feet per second. The reasons for adopting these volumes are as follows:

According to the Commissioners' report 8,000 c. f. s. is the volume of water now being diverted by the Chicago Drainage Canal.

The International Waterways Commission practically sanctioned the diversion of 10,000 c. f. s. when they recommended that the government of the United States prohibit the diversion of more than 10,000 cubic feet per second for the Chicago Drainage Canal.

This recommendation was signed on November 27, by Messrs. O. H. Ernest, George Clinton and E. E. Haskell, for the American section and embodied in a progress report for the year ending, December 1, 1907, addressed to the Secretary of War of the United States. It also formed a part of the report of the Canadian section for the year ending December 31, 1907, addressed to the Honorable William Pugsley, Minister of Public Works and signed by Messrs. George C. Gibbons, Louis Coste and W. J. Stewart.

The volume of 14,000 cubic feet per second is the quantity of water required to operate the hydro-electric plant at Lockport at its full capacity.

Loss of level in Montreal harbor under diversions of

Stage of the river Elevation at Lower Lachine Gauge.	8,000 c. f. s. inches	10,000 c. f. s. inches	14,000 c. f. s. inches
Elev. 18' 0"	9' 5"	12' 0"	16' 8"
1 c ¹ 19' 0"	8' 6"	11' 0"	15' 5"
20' 0"	7' 4"	9' 5"	14' 0"
21' 0"	6' 3"	8' 0"	11' 3"
22' 0"	5' 4"	7' 0"	9' 8"
23' 0"	4' 7"	6' 0"	8' 3"
24' 0"	4' 4"	5' 5"	7' 7"
25' 0"	4' 3"	5' 4"	7' 6"
26' 0"	4' 2"	5' 3"	7' 4"
26' 0"	4' 2"	5' 3"	7' 4"
28' 0"	4' 2"	5' 3"	7' 4"

It will be noticed that this table shows a loss of level of 6.3 inches for a diversion of 8,000 c. f. s. at elevation 21 feet 0 inches,

against the loss of 3.4 inches calculated by the Commissioners, and that at low water stage (elevation 18 feet, 0 inches) the loss of 9.5 inches. To sum up, the loss of level from the Chicago diversion calculated for the average level is 185 per cent of the figure given by Messrs. Haskell, Forneret and Stewart, and the loss of level at low water stage is 23 per cent of their estimate.

CHICAGO DRAINAGE CANAL DIVERSION

EXTRACT FROM REPORT MADE BY MR. WALTER J. FRANCIS, C. E.,
ON THE WATER LEVELS OF THE RIVER ST. LAWRENCE, FEB-
RUARY 7, 1916

The Effect of Chicago Drainage Canal Diversion on Montreal Harbor

We have already stated that one of the factors responsible for the lowering of the water in Montreal Harbor is the diversion made from Lake Michigan for the Chicago Drainage Canal. The amount of water so diverted is stated by Commissioners Haskell, Farneret and Stewart to be about 8,000 cubic feet per second. This amount of water has been diverted from the St. Lawrence River since January, 1900.

The effect of this diversion on the water levels of the river is different at different points, depending on the slope of the river, and on the shape and area of the discharge section at any particular point.

The Commissioners find that the level of Lake St. Louis has been lowered 3.4 inches by the diversion of 8,000 cubic feet per second.

The level of Lake St. Louis is controlled by the discharging capacity of that portion of the river between the lake and Lachine Rapids. The level of the water in Montreal Harbor is controlled by the discharging capacity of the channels of the river opposite Montreal.

The discharging capacity of the river above Lachine Rapids is very much greater than that of the river opposite Montreal. This is clearly shown by the well known fact that the high water in Lake St. Louis is about nine feet above low water, whereas it is nearly twice this amount at Montreal Harbor. Therefore, if the diversion of 8,000 cubic feet per second lowers Lake St. Louis 3.4 inches, as stated by the Commissioners on page 10 of

the printed report, the corresponding lowering in Montreal Harbor will be in the neighborhood of six inches. The Commissioners have based their calculations on a low water flow of 240,000 cubic feet per second and a mean water flow of 298,500, and have assumed that the increment per foot of gauge height is constant between these limits. From the navigator's point of view, the low water stages are the only ones detrimentally affecting Montreal Harbor, for in times of high water or mean water there is ample depth in the harbor. We are at a loss to understand why the Commissioners have chosen a low water flow of 240,000 cubic feet per second from Lake St. Louis in view of the official records of 1895 and 1911, which are considerably lower than 240,000 cubic feet per second, the low water flow of 1911 being about 222,000 cubic feet per second. We are also at a loss to understand the assumption of a constant increment over such a wide variation of flow as they have chosen, because the discharge curve of the river shows that the increment is much smaller at low water than at high.

On page 13 of the printed report of the Commissioners the statement is made that "the Chicago Drainage Diversion has lowered the water in Montreal 3.4 inches * * *." The Commissioners then proceeded to calculate the effect on Montreal Harbor, using the flow of the river at Lanoraie as the basis, at a stage of the river considerable above low water. By plotting the discharge curve of the river at Lanoraie on Plate VI of the Commissioners' report we find that the low water flow of the river at Lanoraie corresponding to the gauge reading of 11.8 as observed in October, 1911, is about 240,000 cubic feet per second. We also find the increment per foot at ordinary low water flow of the river to be about 20,000 cubic feet per second, as compared with 25,000 at a flow of about 300,000 cubic feet per second. The Commissioners have used an increment of 28,300 cubic feet per second. This is higher than the records justify. It would appear that this unduly high increment chosen at Lanoraie has been used to compute water levels, in Montreal Harbor where the increment per foot at corresponding flow is very much less than at Lanoraie.

We calculate that the effect on Montreal Harbor at low water of the diversion of 8,000 cubic feet per second by the Chicago Drainage Canal is about 9 inches.

Present State of the River

At the present time the ship channel has a nominal depth of from thirty to thirty-five feet. In 1906 the "thirty-foot channel" was practically completed with the exception of the widening of it in St. Mary's Current. In 1910 the work of further deepening the channel to thirty-five feet was commenced and has been proceeded with continuously. It may be pointed out in passing that the so called "thirty-foot channel" has a depth of thirty feet when referred to the low water of 1897. Since the water in the river has been lower on several occasions than in 1897 the "thirty-foot channel" sometimes has a depth of twenty-eight feet or thereabouts. This will also affect the "thirty-five-foot" channel to the same degree.

EXTRACT FROM REPORT MADE BY THE LATE C. H. MCLEOD, C. E.,
ON THE WATER LEVELS OF THE RIVER ST. LAWRENCE, FEB-
RUARY 5, 1916

In discussing the level of the water in the Harbor of Montreal, it seems necessary to point out that the statement on page 13 of the report is misleading inasmuch as the discharges given are not those for Montreal but for Lanoraie. The average discharge at Montreal, as given by the Department of Public Works for the gauge readings in question for the years 1910-14, are as follows:

<i>Gauge Height at Montreal</i>	<i>Discharge at Montreal</i>
20.45	260,000
21.88	284,750

These figures show a loss of level in Montreal Harbor of one foot for a reduction in discharge of about 17,000 c. f. s., not 28,300, as stated by the Commissioners. The corrected figure (17,000 c. f. s. per foot) corresponds to a lowering of the water in the harbor of about 6 inches for a reduction in discharge of 8,000 c. f. s. (the amount taken from the flow of the St. Lawrence at Chicago) and not 3.4 inches as given by the Commissioners. Further, if we are to discuss the effect of the Chicago Drainage Canal on the Montreal Harbor, it should be in regard to the lowest stage of the water in the harbor. In 1911, the gauge height in Montreal Harbor fell to 17.9 (October 31st and on November 3d and 4th. *Vide* Public Works report for present

year), corresponding to a discharge of 224,000 c. f. s. At this discharge a reduction of level of one foot corresponds to a reduction of discharge of approximately 10,000 c. f. s., so that the effect of the Chicago Drainage Canal on the harbor is to rob it of eight-tenths of a foot (9.6 inches) at the lowest water stage.

APPENDIX No. 8

(Accompanying Memorandum of Shipping Federation of Canada)

EXTRACT FROM THE REPORT OF THE INTERNATIONAL WATERWAYS COMMISSION ON THE REGULATION OF LAKE ONTARIO, PAGES 83 AND 84, SECTIONS 153, 154 AND 155

To control the stage of Lake Ontario near some fixed level, regulating works could be constructed at the head of the Galop Rapids of the St. Lawrence River. These works would control the outflow from Lake Ontario and maintain the levels of the lake within definite limits. For perfect regulation, the storage in the lake must be discharged during the first half of the year and the outflow must be diminished by the amount of the negative storage during the last half of the year. An examination of Table 28 and Plate 18 shows that, for an average year, the monthly mean total supply to Lake Ontario has fluctuated between 297,500 cubic feet per second in May and 225,500 cubic feet per second in January, while the monthly mean outflow has varied from 283,600 cubic feet per second in July to 219,300 cubic feet per second in February. The maximum monthly mean total supply has been as large as 382,400 cubic feet per second in April, 1870, and as small as 154,100 cubic feet per second in February, 1875, while the maximum monthly mean discharge has been as large as 351,200 cubic feet per second in May 1862, and as small as 152,200 cubic feet per second in February, 1902. In order to accomplish perfect regulation without enlarging the river cross section, the stage of Lake Ontario must be held at such a level that the outflow can be as great as 382,400 cubic feet per second or 31,200 cubic feet per second greater than the maximum discharge to date. This required maximum outflow is only 9 per cent greater than the actual maximum. For the low water year of 1895 the average total supply was 185,700 cubic feet per second while the outflow was 191,600 cubic feet per second. If the oscillations in the levels of Lake Ontario are to be decreased without exceeding the extreme high water of 248.95, then the

level of the lake should be held at such a stage that it will never exceed this maximum limit in months of excessive supply. Two consecutive months of excessive supply occurred in April and May, 1862, when the water yield was 375,600 and 372,000 cubic feet per second, respectively. The outflow through the St. Lawrence River at regulated stage 248.95 would be about 350,500 cubic feet per second. With a maximum discharge through the regulating works, there would still have been in excess in supply of 25,100 and 21,500 cubic feet per second, corresponding to a rise in lake surface of 0.33 foot in April, and 0.28 foot in May, or a total of 0.61 foot in the two months. Hence if the level of the lake under regulation were allowed to fall 0.6 foot or to 248.35 after the close of the season of navigation, then the plane of regulation of Lake Ontario would probably never be exceeded.

Section 154. Regulating works, designed to discharge about 150,000 cubic feet per second, as a minimum, and 350,500 cubic feet per second, as a maximum, could be located at the head of the Galop Rapids, and would control the monthly mean level of Lake Ontario between 246.95 and 248.95, a range of 2 feet. This scheme of regulation would reduce the fluctuations in lake level from $5\frac{1}{2}$ feet to within 2 feet, and would raise the mean level of Lake Ontario about 2 feet.

Section 155. The effect on the stage of water in the St. Lawrence canals with this scheme of regulations of Lake Ontario would be to cause higher water in the first part and lower water in the last part of the navigation season. Such results would injuriously affect navigation.

APPENDIX E

MEMORANDUM SUBMITTED TO THE INTERNATIONAL JOINT COMMISSION, BY THE SHIPPING FEDERATION OF CANADA, ON THE PROPOSED ST. LAWRENCE POWER AND NAVIGATION PROJECT

The Shipping Federation of Canada is a body incorporated by the Parliament of the Dominion of Canada, whose main object is to safeguard the interests of navigation, more especially of the St. Lawrence, and whose president and members are representatives of the principal lines trading from the St. Lawrence to the Atlantic, South African, West Indian, South American, East Indian, Australian, New Zealand and Mediterranean ports, and also of the coasting lines trading between Nova Scotia, New Foundland and the St. Lawrence.

The question of the proposed St. Lawrence Power and Navigation Project, between Montreal and Lake Ontario, has been given careful consideration by the Federation and its members, and it was unanimously decided to go on record as being opposed to the proposed project for the following reasons, which are given herewith in brief:

1. The project of constructing, between Lake Ontario and Montreal, a waterway on the St. Lawrence River having a depth of 25 feet, and to erect at the Long Sault a power house having a capacity of 1,464,000 horsepower, at an estimated capital cost of \$252,728,200, and a maintenance cost of \$2,562,000 a year is economically unsound for the following reasons:

2. It would not be commercially practical for ocean going vessels to trade between Montreal and the Great Lakes ports in competition with the lake freighters. The fixed charges and operating expenses on the lake boats are so much smaller than on the transatlantic steamers that, even counting the transhipping charges, the lake boats could handle the traffic above Montreal at a cheaper rate than the ocean going boats. The lake boats, on the other hand, on account of their light construction, are entirely unsuited for ocean trade.

3. The estimate of \$252,728,200 for a 25-foot navigation between Montreal and Lake Ontario does not give any idea of the sums which would have to be spent in deepening the harbors of the Great Lakes and the connecting channels between the various lakes. The depth of Great Lakes' harbors and channels does not average over 20 feet, and E. H. Outerbridge, Chairman of Port of New York Authorities, claims that this work would cost from \$500,000,000 to \$1,000,000,000. To this sum should also be added about \$75,000,000 to cover the expenditure for the deepening of the Welland Canal. The important item of interest during construction has also been apparently neglected.

4. To the estimate of maintenance costs, \$2,562,000, should be added the maintenance cost on the Welland Canal and the fixed charges on the whole capital expenditure. No mention of these fixed charges is made in the report, and on the Lake Ontario-Montreal division alone they would mount up to over \$20,000,000 a year.

5. No evidence has been submitted to the Shipping Federation of Canada demonstrating that the probable traffic requirements were such as to justify the enormous expenditure required to provide 25-foot navigation from Fort Williams to Montreal. Besides, if a deeper waterway were required, preference should be given to the Ottawa route, which has the advantage of being shorter and of being entirely in Canadian territory.

6. The quantity of power which it is proposed to generate at the Long Sault, viz., 1,464,000 horsepower, is just about equal to the total water powers developed in the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, New Jersey and Pennsylvania, or to the water powers developed in the Provinces of Ontario and Quebec.

7. The report states that the water power development should be considered as a by-product of the navigation project, but there is nothing to show how the sale of this power or of the power rights would help to carry the navigation project.

8. There is no demand for this amount of power in Canada, and the danger is that the power, once exported into the United States, would be lost to Canada.

9. Canada has no interest in the international development of power on the St. Lawrence River. She owns 80 per cent of the total power available between Lake Ontario and Montreal and over 60 per cent of this power is entirely in Canadian territory.

There are besides about 1,000,000 horsepower on the Ottawa River, making a total of over 3,500,000 horsepower entirely in Canadian territory which could be developed, if necessary, to serve the territory in Ontario and in Quebec which would be served by the proposed Long Sault development.

10. The navigation interests on the St. Lawrence require all the depth of water available between Montreal and the sea, as each inch of available depth in Montreal Harbor means an additional cargo of 52 tons. Nearly every year the depth of water in the so called 30-foot channel is appreciably less than 30 feet. It has been as low as 26 feet. This reduction in the available depth has been brought about partly by the dredging and partly by the Chicago Drainage Canal diversion.

11. The report of the Canadian and American engineers states that a daily fluctuation in the pool above the proposed Long Sault dam of 1 foot 5 inches is anticipated, and further, that "it is not probable that variations will occur greater than can be compensated for by the use of Lake St. Francis as a flattening agency." The shipping interests claim that it is impossible to predict these fluctuations without knowing exactly the nature of the load of the proposed plant and that the storing up of the water during off peak hours would most probably occasion dangerous daily fluctuations in the level of the river at and below Montreal.

12. In conclusion, the Shipping Federation of Canada is of the opinion that in view of the ever increasing burden of direct and indirect taxes in Canada, no new construction should be undertaken without being assured that the tangible returns will be sufficient to cover both the maintenance costs and the fixed charges.

APPENDIX F

Widespread Opposition to the St. Lawrence Project

It was reported some time ago at Ottawa that the Dominion government was indisposed to assume the joint liability for the cost and maintenance of such a waterway as that recommended by the International Joint Commission. Among the grounds on which opposition to the project is based are the following:

1. That the proposal is only a camouflage for the development of water power, with Americans the beneficiaries.

2. That it is not economically feasible for ocean-going ships to traverse narrow channels.

3. That, as a matter of policy, it would be unwise for Canada to internationalize the St. Lawrence River and the Welland Canal.

4. That the damming of the St. Lawrence would have the effect of shortening the navigation season on the lower reaches of the stream by preventing the free run of ice.

5. That there are other waterway projects, wholly within Canadian territory, which are waiting and from which greater benefits would flow.

6. That Canada is now so heavily involved in other public enterprises that her financial condition does not warrant her entering upon this billion-dollar undertaking.

Robert W. Redford, president of the Shipping Federation of Canada, said: "From an economical point of view, it is improbable that the ocean-going vessels will ever make a practice of trading to ports on the Great Lakes. No matter to what extent the canal systems west of Montreal are enlarged and deepened, as the cost of upkeep of ocean steamers, the delays proceeding through the channels and danger of damage would be too great to make it a revenue paying proposition. When we read in speeches of such men as the secretary of the Illinois Manufacturers' Association that they will see deep draught ocean liners from Seattle, Vancouver, San Francisco, Vladivostok, Yokahama and other oriental ports sailing up the St. Lawrence through the canals to Chicago, it almost makes one think they have lost their senses in the West. It is unsound economically; it is not possible."

Continuing, W. R. Meldrum of the *Buffalo Evening News* reported on January 28th as follows:

AGAINST INTERNATIONALIZATION

The people of Canada resent particularly that part of the Commission's recommendation with regard to the Welland Canal—that it be internationalized along with the St. Lawrence. "This is a suggestion which public opinion in this country will be slow to sanction," says the *Montreal Gazette*. "The Welland Canal is purely Canadian, is being constructed wholly in Canadian territory, and in the interests of Canadian transportation. It is in no sense international, and no attempt to make it so can be regarded as other than objectionable and dangerous. It is remote from the proposed St. Lawrence waterway and is governed by none of the conditions which are being invoked in support of the internationalization of the latter."

"Would the American people consent to the internationalizing of the Mississippi River?" a Shipping Federation member asked the *News* man. "And how about the Panama Canal? You have the free use of the existing Canadian canals. You are on perfect equality with Canadian vessel owners, yet you propose to give preference to American ships in the matter of Panama tolls. If such a proposal as this for the St. Lawrence were advanced with regard to an American waterway, a country-wide protest would sweep in on Washington. We are good friends, and we wish to be generous, but to internationalize the St. Lawrence—that is asking too much."

Here is more along the same line; this from the Rev. Canon Scott of Quebec, former chaplain in the C. E. F.:

"The St. Lawrence, with the exception of about 100 miles, lies wholly in Canada. It is a gigantic asset of this country. But it is not merely a Canadian asset, it is an imperial one, and must be wholly under our control. At some future time the empire might be at war with a foreign power with which the United States was at peace, and it might be necessary for us to close the river by mines or in other ways. It is the very spinal marrow of Canada. The internationalizing of the St. Lawrence would cut us off both really and sentimentally from the lower provinces. The thing is unthinkable."

Colonel William I. Gear, vice-president of the Robert Redford Company, agents of the Cunard, the Anchor, the Donaldson and

the Donaldson-Thompson lines, who has been interested in deep sea shipping for fifty years, in conversation with the *News* man, expressed the opinion that it would be dangerous to interfere with the flow of the St. Lawrence by building such dams, canals and other works as the International Joint Commission recommends. "The action of the ice in the spring of the year is an unknown quantity," he said. "Nature has made the channels, and we believe that any interference with the flow as we have it now would interfere with the flow of water between Montreal and the ocean. Though deeper canals might be made to suit the whim of a certain section of the North American continent, they might find that they had failed in their object, as they had so seriously interfered with the water below the Lachine rapids."

"Ocean steamers will not go up the canals on account of their excessive cost," Colonel Gear told the *News* man. "Lake steamers are more economical for use in canals, for the reason that ocean vessels are so costly that they must be kept at sea as long as possible, in port as short a time as possible. To proceed west from Montreal would mean employment of great capital at the maximum of expense, at an average speed of about four knots an hour, while, when at sea, steamers proceed at full speed. The cheapest means of transportation is the use of canals by lake vessels and the transfer of cargo at the seaport."

"The opinion of those in favor of the canal, that ocean vessels, if they do use the canal, would call at the various ports for cargo, is economically unsound from a commercial standpoint. It is well known in commerce that steamers will not go to two ports, if it is practicable to load and discharge them at one, so that such ports as Toronto and other Canadian and United States ports would never get the vessels, goods would still have to be handled by rail or water to the seaport, where they would be loaded on such vessels as made the seaport their terminus.

"Bear this in mind, any deviation from the accustomed course of a vessel means additional expense. If we have a vessel loading here for London, and a skipper has a consignment of goods that he wishes us to load on it for Liverpool, there are many things that we must take into account. The deviation means two days added to the steamer's time. Then, there are pilotage charges, port charges, wharf charges and a number of other details, all running money."

"Now if a ship were loaded at Chicago for overseas, and it had to stop at Detroit to take on automobiles, then stop at

Toronto to take on a shipment of provisions, costs would mount at a rapid rate, for there is a large crew to be fed, there is the heavy investment represented in the cost of the vessel to be considered. With every stop the steamer is spending, not making. Of course, the shipper has to pay the freight. And he would find it a heavy toll with ocean-going vessels."

"How about the cost of the St. Lawrence project?" Colonel Gear was asked.

"There seems to be a complete overlooking of the fact while canals would be deepened the harbors along the river and lakes would also have to be deepened," he replied, "otherwise vessels would not be able to use them. I think none of the harbors are over 20 feet and few of them that depth.

"In estimates for building the canals this item has not been thought of, or apparently not made much of. Nor has the cost of deepening the existing channels to 30 feet been considered. The depth that would be required would be 30 feet, as large vessels now building have a draft of 27 feet, 6 inches to 30 feet, and 30-foot draft, would at least require an additional 2 feet of water. The more water that is required the longer and deeper the channel has to be dredged and the greater the cost."

"And the general effect on the river — how about that?"

DAINGEROUS TO MEDDLE

"The St. Lawrence River should not be interfered with. The action of the ice in the spring of the year is an unknown quantity. Nature has made the channels, and we believe that any interference with the flow as we have it now would interfere with the flow of water between Montreal and the ocean. Though deeper canals might be made to suit the whim of a certain section of the North American continent, they might find that they had failed in their object as they had so seriously interfered with the water below the Lachine Rapids."

Colonel Gear, like all others who have given attention to the St. Lawrence project, sees the sinister hand of the Power Ring guiding it.

"The building of the canals is only a camouflage for the development of water power to satisfy the greed of some manufacturers," he remarked.

"As for Canada, financially, we are unable to bear the cost and will not be able to for a number of years to come. The Canadian

government should not enter into any alliance that will require the spending of any large amount of capital at this time.

MIGHT DISTURB RELATIONS

"Further, we do not believe that internationally it is a wise move. Complications would be likely to arise, as it is hardly possible for the United States to expend large sums of money in Canada without having some understanding which it can be easily imagined, under certain conditions, might lead to trouble, unless the United States is prepared to contribute to the share of the cost and hand it over to Canada without any strings being tied to it.

"The reason today why steamers make their terminus at the various Atlantic ports, including Montreal," Thomas Robb, secretary of the Shipping Federation of Canada, told the Joint Commission, "is on account of the unobstructed navigation. As soon as you have obstructed navigation, such as with canal locks, you immediately increase the cost of navigation. The delays in proceeding through the canals and danger of damage would be too great to make a revenue-paying proposition. No regard seems to be given to the fact that the cost of an ocean-going ship is treble the cost of a lake vessel. I know of no man in the United States or Canada familiar with conditions who for a moment thinks the St. Lawrence project would be feasible."

Appearing before the International Joint Commission, Joseph Quintal, representing La Chambre de Commerce of Montreal, said: "It would not be wise for the Dominion of Canada to embark upon such an enormous expenditure for development of the Great Lakes and the St. Lawrence as outlined. We have been consistently in favor of the construction of the Georgian Bay Canal, which we believe from economic standpoints as well as purely Canadian interest should have preference over any project for a large expenditure of money on the enlargement of the St. Lawrence canals or the deepening of the river.

NOT FOR OCEAN SHIPS

"The Great Lakes and St. Lawrence proposition is mainly a water power development. When you talk of making ocean ports of such Great Lake ports as Chicago, Duluth, Port Arthur and Fort William we believe that though it might be possible from an engineering standpoint — we believe engineers could so

deepen the river as to enable some of the large sea-going boats now to come up—nevertheless, from economical standpoints we believe it absolutely prohibitory.”

ABSORPTION FEARED

“We feel that we should not give any portion of our national territory or create any servitude or give any privileges to a combination composed of representatives of Americans and Canadians,” said Alfred Lambert, speaking for La Chambre de Commerce of this city, at a hearing before the Commission on November 14, 1921. “We feel that it might cause in the future friction and issues which we should avoid at all times. We feel that Canada should control all it owns within its boundaries for the present and the future.

“The more we follow this question the more we understand it is the development of power rather than navigation that is the design.”

“We are utterly against the idea of damming the St. Lawrence to produce electric power,” said C. H. Catelli, also speaking for La Chambre. “We are of the opinion that the St. Lawrence should be preserved as an asset of Canada and should never be used for the development of water power.”

These further representations were made for La Chambre de Commerce:

1. That the deepening of the St. Lawrence is to the advantage of the United States and the detriment of Canada.

2. That the deepening of the St. Lawrence in co-operation with the United States would mean the gradual absorption of the weaker by the stronger party.

3. That it would not be economically practical for ocean-going vessels to trade between Montreal and Great Lakes ports.

4. That Canada has no interest in the international development of power on the St. Lawrence river. She owns 80 per cent of the total power available on the stream between Lake Ontario and Montreal and more than 60 per cent of this power is entirely in Canadian territory. There are besides about 1,000,000 horsepower on the Ottawa River, making a total of over 3,500,000 horsepower on the two streams, entirely in Canadian territory, which would be developed, if necessary, to serve Ontario and Quebec.

5. That if there were need of a deep waterway between Montreal and the Great Lakes, the Georgian Bay route, which is economically practical, should be adopted.

GEORGIAN BAY ROUTE BETTER

"We are already feeling keenly the competition of Buffalo, Oswego and other American ports," said Joseph Quintal of Montreal. "By the Georgian Bay route we could enlarge on the business that we are now doing. This canal would be more economical to maintain and manage than the proposed St. Lawrence improvements. There would be fewer locks on the Georgian Bay route, and there would be a saving of from two to four days as compared with the route proposed to the Commission."

J. A. Jameson of Montreal, an engineer of twenty-five years' experience in the development of port facilities, would not have even the lake vessels use the canals, because of the delay in passing through the restricted channels. He holds that trans-shipment to boats particularly built for canals is economical procedure. Here is what he told the Commission:

"As a result of a study of all available data as applied to the proposed St. Lawrence deep waterways system I have very strongly formed the opinion that it cannot be an economical navigation project.

"This is largely due to the fact that any possible saving in the cost of transportation that might be effected by enabling the larger steamships to pass into our canal system and to upper lake ports, take cargo there and transport it to the sea and across the Atlantic, without the breaking of bulk, which is one of the greatest points involved, would not be sufficient to pay even a fraction of the interest on the cost of construction of such a waterway.

BIG BOATS TOO EXPENSIVE

"Ocean boats are too expensive to build and operate to economically navigate canals, lakes and restricted channels. Deeper ports and channels, new equipment at ports—all these things would be necessary. You can't trade around, taking up part of your cargo at one point and part at another and do it economically. The present canal system could handle, with proper equipment and facilities, four times the present amount of traffic.

"The lake vessels carry 100 tons one mile at a cost of 4.2 cents. That is on open water. When these same vessels — ones of 8,000, 10,000 or 12,000 tons — pass into a canal such as the Welland, the costs from port to port, say, Port Colborne to Port Dalhousie, 27 miles — assuming that she goes back light — jump to 40 cents per 100-ton mile, or ten times as great.

"Lake boats make from 10 to 12 miles an hour. From Fort William to Port Colborne is 847 miles. It is about 84 hours from port to port. They can make the round trip in 168 hours. In the Welland Canal the average speed is 2 miles an hour. That would mean 14 hours to get through — 28 hours both ways.

"A study of all the data leads to the conclusion — and I have no opinion except such as figures bear out — that our big lake boats are not economical, and cannot be considered as economical, in working through our canals. Remember, they run at slow speed; in fact, the speed is not sufficient to give them steering way in many cases, particularly if they have a little beam wind. I have known boats in the Welland Canal to be tied up practically two days owing to winds.

"All these are contingencies that have to be worked into navigation costs. In fact, canal vessels built for the trade can actually carry cargoes through our canal systems at a lower cost than lake vessels. In working out this problem I have had available reliable information of those engaged in the trade as to the cost and the time, and so on."

GEORGIAN BAY ROUTE PROPOSED

More than that, Canada has had in mind for several years the construction of another waterway, one for which final plans have been made and one which lies wholly within Canadian territory — a project that is generally conceded to be feasible to establish proper and adequate connection with the Great Lakes. This is the Georgian Bay route — from Lake Huron to the St. Lawrence by way of the Ottawa River. Not only would that meet every requirement of transportation in the opinion of shipping men, but along with it would go power developments, which, it is believed, would be sufficient to supply the "white coal" needs of eastern Canada for a century to come. This power is on the Ottawa river and its tributary streams. The cost of the work would be only a fraction of the cost of the St. Lawrence project, so engineers of recognized worth declare.

POWER IN ABUNDANCE

The potential of the Ottawa is 1,000,000 horsepower. Then, the tributaries of this stream—the Rouge, the Lievre, the North, the Gatineau, the Coulonge, the Black and the Des Moines—would yield another million horsepower. More than that, the cost of developing power along this route would be less than half the cost of developments on the St. Lawrence.

“The United States interest,” said the Federation’s expert, “centers in the power at the Long Sault, where an American company has already expended \$2,000,000 or \$3,000,000 in acquiring land. On the Ontario side there is only a strip 20 or 30 miles in width, from Cornwall to Brockville, which can be more easily supplied with power from the Ottawa River, and every foot of this strip is at a distance of from 25 to 70 miles from important sources of power on the Ottawa, any or all of which can be developed more cheaply than the Long Sault power—and are free from international problems. No industry of any consequence in this territory either obtains its raw material or markets its product locally.”

Canadians wish to be able to develop, regulate and control their water powers as they see fit in the interest of Canadian industry and commerce. That is one reason the Georgian Bay route appeals so strongly to them. Here are some plans they now have in mind in connection with the route.

North of the island of Montreal on the Black River there will be developed at two sites 148,480 electrical horsepower.

At Hawkesbury, 60 miles from Montreal, there will be developed 71,800 horsepower.

At Point Fortune, 50 miles from Montreal, 148,000 electrical horsepower.

At the Chaudiere, 127 miles from Montreal, 45,000 additional horsepower will be available after the canal is constructed.

At the Chats Falls, 155 miles from Montreal, 113,500 horsepower will be developed.

At Portage du Fort, 174 miles from Montreal, 68,300 horsepower will be developed.

At Rocher Fendu, 183 miles from Montreal, 78,000 horsepower.

At Grand Calumet Falls, 56,000 horsepower.

At Paquette, 209 miles from Montreal, 24,900 horsepower.

At Des Joachims, 266 miles from Montreal, 60,400 horsepower.

At Rocher, Capitaine, 204 miles from Montreal, 82,000 horsepower.

At Deux Rivières, 296 miles from Montreal, 28,400 horsepower.

These powers are all within easy transmission distance of points along the St. Lawrence.

ANOTHER PITTSBURGH DISTRICT

Talking of the Georgian Bay route and its power possibilities, W. F. Tye had this to say:

"With the rapid depletion of the high grade iron ores, and the increase in the cost of coal which must come from the great waste and rapid exhaustion of the easily mined high grade seams, the great advantages possessed by Pittsburgh and the Ohio Valley as a manufacturing center will disappear. With the disappearance of the great advantage now enjoyed by Pittsburgh will come Canada's great opportunity.

"The construction of the Georgian Bay canal will develop a very large amount of water power. It is conservatively estimated that the Ottawa and its tributaries will give 3,000,000 horsepower, equivalent in power requirements to the mining of 40,000,000 tons of coal per annum.

"This water power, unlike coal, can never be exhausted, and with the rapid depletion of the coal and iron in the United States, and with the enormous horsepower of the Ottawa and its tributaries and the low grade iron ores of the Ottawa Valley, it is easily possible that in years to come the great manufacturing center of this continent may be transferred from the Ohio Valley to the Ottawa Valley. There is no reason why it should not if the people of Canada have the enterprise to make it so. For such reasons as this I believe that the construction of the Georgian Bay Canal is a national necessity."

R. M. Wilson, chief engineer of the Montreal Light, Heat and Power Company, told the Commission that the cost of developments on the St. Lawrence, along the lines proposed, would be so great that power would have to be sold at from \$60 to \$75 in the nearest markets. That would be more than the cost of coal-made electrical power. On the St. Maurice River, where 700,000 horsepower is available, the cost would be about one-third, he said, of that on the larger stream. St. Lawrence developments could not stand competition with those in prospect on other nearby rivers.

"There is enough power in the St. Maurice River to supply this section of the country for 30 or 40 years," said Mr. Wilson, "without taking the St. Lawrence into account at all."

Finally, this statement, made before the Railway Committee of the House of Commons by Sir Adam Beck, chairman of the Ontario Hydro-Electric Commission, Canada's foremost power man, should be considered:

"The Ottawa River must be the backbone of the supply of electricity to the Province of Ontario. We are limited on the St. Lawrence by treaty obligations, and we must depend on one great source of supply, the Ottawa."

Mayor Marshall of Calgary told the Commission that the people of his city had no interest in the power end of the enterprise and knew nothing of the navigation feature of it. "From the remarks of Mr. Craig," he said, "it would seem that the power to be developed by the scheme is tremendous."

WESTERN PROVINCES

"We feel that to ask Western Canada to contribute toward the cost of the St. Lawrence project is a little previous," observed Mayor Gray of Winnipeg. Winnipeg is unalterably wedded to another project. Regina listens patiently, but still thinks the Hudson Bay the natural trade route from Western Canada to Europe. Calgary turns her eyes to the west, deeply interested in the experiment of shipping Alberta grain by rail to Vancouver, thence by boat through the Panama Canal to Liverpool.

SEE NO COMMERCIAL BENEFIT

British Columbia is, of course, not interested in commerce by way of the Great Lakes and the St. Lawrence. Her outlook is on the Pacific, not the Atlantic, and so far as trade with Europe is concerned she finds in the Panama Canal her most economical route.

The maritime provinces, New Brunswick, Nova Scotia and Prince Edward Island, also can see no commercial advantages for them in the St. Lawrence waterway. Public opinion in these provinces is insistent that Canada must not be committed to any undertaking involving large expenditures unless the government is absolutely convinced that it is necessary in the interests of all the country, not of a particular section—say, the Province of Ontario.

There is the testimony of Chief Engineer Wilson of the Montreal Light, Heat and Power Company, that on St. Lawrence

developments the cost of power at the generating station would run to more than \$40 a horsepower, and would probably have to be marketed at from \$60 to \$70 a horsepower.

Colonel Cooper says that the figures submitted by the Commission's engineers do not show half the cost of the power feature of the project. More than that, he has said that the power dams proposed are of a type which would be destroyed in the first run of ice in the river.

In summing up opposition to the proposal of the International Joint Commission, men who are in touch with affairs point out that Canada is in no condition financially to enter upon the St. Lawrence development, which they are certain will run to a billion dollars or more. Canada now is bearing a burden of \$2,300,000,000—a debt largely of the war. On top of that there is a deficit this year of about \$70,000,000 from the railroads, taken over by the government. The budget for the year ending March 31, 1922, is \$411,845,842.22. And in considering these figures it should be remembered, as was pointed out to the *News* man, that the population of Canada is only 8,500,000. Business men consider that it would be foolhardy, in the circumstances, for Canada to enter upon the St. Lawrence development.

Citizens of the United States familiar with the matter are also opposed to the St. Lawrence Ship Canal and Power project. Hon. Lewis Nixon expressed his opposition to the project to W. R. Meldrum of the *Buffalo Evening News* as follows: "Our contention is that a ship canal from the Great Lakes to Montreal would not be a success commercially and that money spent upon it would be wasted, so far as the United States is concerned. Only those with little knowledge of water carriage advocate the navigation of rivers and canals by ocean-going ships, except for short cuts. And it cannot be said that the proposed waterway would in any sense be a short cut.

NAVIGATION COSTS QUOTED

"Great ships built for the open sea or the lakes must proceed cautiously and with very great reduction of speed in shallow waters. In this case, we may assume a speed of five miles an hour to be the maximum."

Mr. Nixon was asked about the ordinary speed of lake freighters.

"Cargo vessels on the Great Lakes run about ten miles an hour," he said. "So in the canalized river, between the lakes and Montreal, a vessel would take twice the time that she would require to cover a like distance in the free, deep waters of the open sea or lake."

Then, turning to the economic side of lake vessel navigation, Mr. Nixon said that consideration should be given to the fact that the ships that would use the St. Lawrence route would have to make their earnings in seven months, for the Canadian stream is clogged with ice for five months of the year.

"We may safely place the cost of navigating the ordinary lake vessels at \$500 a day," said Mr. Nixon, "and we need only look into the use of the proposed Montreal route to be convinced that when using it vessels must charge such high rates that cargoes will be driven to a cheaper route, if such cheaper route exists, and such cheaper route does exist by way of the lakes and the Barge Canal.

PRESENT PLAN PAYS PROFITS

"We can bring about 250,000 bushels of grain from Duluth to Buffalo, with return cargo of coal, in about eight days. Assuming the lake freight at the high level figure of 4 cents a bushel, the down trip would pay \$10,000 and \$4,000 for coal would pay the expenses back.

"But if the same vessel went to Montreal, the trip would cost about \$4,500 for the nine days required. There would be no coal to bring back, so that in coming back, saving a day in the run, she would spend another \$4,000. And please note that instead of making twenty trips she would make only ten. So, unless she could receive twice the rate per bushel, she could not engage in the service. While, if she charged twice as much, the owner would forfeit the business."

Mr. Nixon called attention to the fact that insurance rates by the St. Lawrence route are higher than by way of New York, owing to the danger of the river route with its fogs, ice and excessive tidal currents. He offered as pertinent to the St. Lawrence project this observation of the Bureau of Foreign and Domestic Commerce, made in 1918, on another waterway project:

"Before recommending the construction of a new canal at a high cost, assurance must be given that the direct and indirect benefits to be derived are commensurate with the outlay required. It must also be demonstrated that the existing facilities are in-

sufficient and cannot be made sufficient at a cost lower than for the proposed ship canal."

ST. LAWRENCE LITTLE USED

The logic of this lets light in on the sophistry of the advocates of the St. Lawrence Ship Canal. The St. Lawrence River now is canalized in the rapid reaches, and in recent years it has been used very little. Despite the insistence of the middle west that an outlet is sorely needed by way of the Canadian stream, the waterway provided is neglected. Almost all the grain that is shipped from the middle west to Montreal reaches that port by rail.

"In the event that the development of traffic overtakes possible terminal facilities at Buffalo," said Mr. Nixon, "we have the potential domestic routes through Oswego and Albany, by the improvement of Oswego Harbor and the deepening of the Hudson River to 27 feet to the Federal dam at Troy.

"The development of these two auxiliary ports would provide against any possible future incapacity of existing and proposed facilities, and such projects would be based not only upon the economical advantages to be secured in convenience, speed, safety and cost, but would retain to this nation the benefits of handling its own commerce.

"We need the money that would be wasted in a commercial sense, on this out-of-our-country route for many pressing domestic projects directly in the interest of this country. I can recall no instance in history where one nation has diverted commerce to another to its own disadvantage."

Mr. Nixon is a ship builder and is thoroughly familiar with ocean-going and Great Lakes vessels and their operation, and his opinion as to the St. Lawrence project ought to carry great weight with it.

Mr. Walter D. Beardsley, an engineer with the Waterways Conference Committee, in speaking of the St. Lawrence project to Mr. W. R. Meldrum, said, "the entire superpower zone is within an area occasionally subject to severe sleet storms, and authentic records show that sleet one and a half inches in radial thickness has been formed on line conductors. The cost of building transmission lines to withstand so heavy an accumulation of sleet would be prohibitive. The remedy is to keep the lines so warm during a sleet storm that ice will not collect on them, either

by transmitting sufficient energy over them or by sending enough current through them at low voltage."

"In other words," as Mr. Beardsley observed, "the thing to do is to anticipate sleet storms. But how to do that is a matter of discovery. Certainly the conditions which he describes as obtaining in the Boston-Washington district do not differ much from the conditions of this section. The difficulties of the situation would, of course, increase with the increase in length of the transmission line."

If there is no demand in New York for St. Lawrence power, neither is there in New England, according to Mr. Murray, the superpower zone engineer. In the Boston, Lowell, Providence and Worcester district the available electric energy amounts to 972,000 horsepower. Industry there demands only 743,000 horsepower. In western New England, embracing the manufacturing centers of Hartford, New Haven and Northampton, the available supply of electrical power is 560,000 horsepower. The demand is for only 408,000. There is power enough and to spare. So St. Lawrence power would be a drug on the New England market.

F. D. DeBerard, research director for the Merchants' Association, in a talk with the *News* representative, called attention to the statement of Senator McKinley of Illinois, that the completion of the St. Lawrence route would mean the movement of 200,000,000 tons of commodities from the inland for export.

"This, in spite of the fact," said Mr. DeBerard, "that the total exports of the United States for 1920 were 54,000,000 tons — that is, for all the ports of the country, Atlantic, Pacific and Gulf.

"A factor of controlling weight in this whole situation is the limitation of cargoes available for loading ocean vessels plying to and from lake ports. The quantity of commodities available for this traffic, both outgoing and incoming, is much restricted in comparison with the range of commodities available for freights in the principal ports of the world, and except perhaps as to a few bulk commodities ocean vessels destined for lake ports would have much difficulty in securing full cargoes.

SHIPS COULDN'T FIND CARGOES

"Similar disabilities would apply with even greater force to outgoing cargoes of the manufactured products of the lake areas. They would be diverse in their nature and destined ultimately

for widely separated parts of the world, and by reason of their diverse destination could seldom supply full cargoes for particular foreign ports.

With regard to the export of wheat, of which the proponents of the St. Lawrence project make much, Mr. DeBerard gave it as his opinion that it would not be many years before there would be no American grain for export, because all the farmers of this country can raise will be held for domestic consumption.

"Of course, the farmers will not concede that all their grain will be taken by this country, but certainly that is reasonable enough to believe. It is not to be forgotten that when Russia returns, and with the Argentine increasing her grain crops, competition will be very keen in the export grain business. With land and labor cheaper in these countries, would American farmers be able to compete in foreign markets? I doubt it."

Hon. Frank S. Gardner, secretary of the Board of Trade and Transportation of New York, in an interview with the *Buffalo Evening News*, said that "water power is the real objective of the great propaganda (for the St. Lawrence project). If this real objective had been squarely stated, not one of the States of the middle west would be supporting it. But the propagandists adopted the slogan, 'The Lakes to the Sea,' and the west blindly fell into line — catspaws to draw the power chestnuts from the fire.

"The St. Lawrence waterpower project is not new. The State of New York gave the Long Sault Development Company a charter in 1907. The company defaulted its payments. The charter was repealed in 1913. The company took the matter into the courts and was defeated in the United States Supreme Court, and the State reclaimed the powers which had been given away for a song. This power is owned partly by the State of New York and partly by Canada, and it will be developed when a plan is proposed that regards the interests of this State and of Canada, and which they can jointly approve. But it cannot be grabbed under any international scheme as now proposed for the improvement of navigation, or without the consent of New York State.

SOME IRREMOVABLE OBSTACLES

"We are opposed to the St. Lawrence project for other reasons, and they are not selfish. While engineers can undoubtedly overcome and remove the obstacles to navigation in the St. Lawrence

River, if a sufficient amount of money is provided, the St. Lawrence River even at the greatest attainable depth cannot be made any shorter, the lake ports can never be brought any nearer to the deep ocean, the climatic conditions can never be modified, the transportation there can never be made as cheap as existing routes. However much its navigability may be improved, the advantages this may give will be neutralized by these natural and unchangeable disadvantages and dangers.

"Thus far this proposition and the great propaganda in its behalf have been promoted upon manufactured sentiment, where it has not been based upon unwarranted assumptions. The picture has been painted and presented to the imagination of the ambitious and thrifty people of the Great Lakes States, and, forgetting or ignoring all else, they have been led to believe that by the skill of the engineer, as by the lamp of Alladin, the wonder will be accomplished.

Mr. Gardner maintains that the St. Lawrence route, under the most favorable conditions — improved as far as may be — never would be able to stand competition with the New York Barge Canal.

"The season on the Barge canal is never less than seven months," said Mr. Gardner, "and sometimes it is a week or two longer than that. The navigation season on the St. Lawrence is frequently shorter than seven months. Say the canal is open on the average 210 days a year. In each of those 210 days it can pass through its locks, without pressure, 124,800 tons of freight, and in the whole 210 days a total of 26,208,000 tons. This is what the Barge canal can do taking life easy. What it could be made to do under pressure I do not venture to predict.

"This is the modernized route with which it is assumed the St. Lawrence could compete successfully. This tonnage, of which I have spoken, if it were all wheat, is equivalent to about 902,267,000 bushels. It is equal to 13,104,000 tons easterly and the same westerly. To carry the same tonnage out by the St. Lawrence River would call for a fleet of 1310 vessels of 10,000 tons freight capacity each.

'Let Congress get the facts of the case straight. That is all there is to defeating the proposal to commit this country to this billion-dollar scheme. The more the project is studied and the better it is understood, the more formidable and widespread is the opposition thereto. The sentiment in New England is crystallizing against it.

The South Atlantic and Gulf states are beginning to realize that the squandering of millions in the St. Lawrence River will further delay needed improvements in their own waterways and they are beginning to pull away from the St. Lawrence project.

Norfolk, Wilmington, Savannah, Brunswick, Charleston and Portland, Me., are on record as against the St. Lawrence project. Galveston and New Orleans are expected soon to join forces with New York.

Without exception, men familiar with ocean shipping declare that the project is not feasible. The people generally are beginning to realize that if the United States is committed to the enterprise, plans for the improvement of water courses wholly within this country will be held up indefinitely, that the whole program for the development of inland waterways will be set aside. And there is hardly a section of the country but has some plan for inland navigation.

As to New York and Montreal ocean insurance, the president of a large marine insurance company said:

"New York is an all-season port, open for commerce 12 months in the year. Montreal and Quebec are seasonal ports open for navigation only between the first of May and the last of November.

"When the St. Lawrence ports first open there is more or less floating ice in the river, and in the approach to the river, which decreases as the season advances, so that in the latter part of May and during June and early in July comparatively safe navigation is had in the river.

"Late in July and during the following weeks the conditions at the mouth of the St. Lawrence River and its approaches are rendered extra hazardous, due to conditions of fog and as the season advances toward its close ice conditions again become prevalent, rendering navigation hazardous.

"In the port of New York, on the contrary, no such difficulties are encountered at any season of the year.

"Were ocean vessels to continue beyond Quebec and Montreal, say to Chicago, the same seasonal difficulties would be met, not only in the river but on the Great Lakes, and in addition to this there would be the extra hazardous difficulty of navigating long canals and passing up and down connecting locks."

Marine insurance underwriters of Philadelphia told the joint commission that rates on the St. Lawrence were 50 cents, as

against 22½ cents to Atlantic ports of the United States, and this applied to all seasons of the year.

Cornelius Elder, a New York marine insurance man, informed the commission that the New York to Liverpool rate was 25 cents and that the corresponding rates, Montreal to Liverpool, were 27½ cents from the opening of the navigation season up to the middle of October, then 32½ cents to November 1, 42½ cents to November 16, and 55 cents from that date to November 25, or the close of the season.

The fact that conditions on the St. Lawrence route make navigation more hazardous than by route to the southward is clearly indicated in the revival, by the proponents of the power and ship canal project, of the proposal to construct a dam across the Belle Isle strait to keep icebergs out of the Gulf of Saint Lawrence.

Honorable J. Hampton Moore, Mayor of Philadelphia, and President of the Atlantic Deeper Waterways Association, in an article in the Philadelphia *Ledger* of March 5, 1922, said: "We may fairly ask why, with the Mississippi, the Missouri and the Ohio not working to full capacity, and all awaiting further development, and an uncompleted chain of waterways along the east coast, where we have one-third of the entire population of the country and 50 per cent of its wealth, we should at this time, when the nation is staggering under its tremendous war load, start a new project running through a foreign country, the initial cost of which is conceded to be \$250,000,000 and the maintenance cost of which no one can safely estimate.

What is the idea? To some of us who have been watching this project it looks wholly and solely like a water-power proposition. This seems to be the opinion of some of the high officials of the Dominion of Canada, but the Northwestern boomers say they want this St. Lawrence waterway to enable them to get their grain to Liverpool by direct shipment from ports like Duluth and Chicago. Is it within the range of possibility that the expenditure even of a billion dollars via the Welland Canal and the St. Lawrence River will ever enable the Northwestern grain growers to deliver a single cargo from a point like Duluth, substantially 2000 miles inland, to the mouth of the St. Lawrence for delivery at Liverpool?

In the first place, whereas even the dreams of so eminent an American-Canadian transportation man as James J. Hill, who

in 1907 predicted the use of the Mississippi River by way of the Gulf for Western farmers' use, have not yet been realized; and whereas most of our Eastern projects are lagging for want of appropriation by Congress, will it be possible to so canalize the proposed Canadian waterway around rapids and through connecting land so as to realize the passage of a ship from a point like Duluth in the next fifty years?

If there is a completed waterway anywhere short of that time, will it be possible to send out from Chicago or Duluth — as we are able now to send ships from Boston, New York, Philadelphia or Baltimore — except during the four months of the year, when the ice doesn't freeze up the St. Lawrence? Have our Western friends who are now so strong in Congress, having at least thirteen (13) States behind them in their agitation, given serious consideration to the ice-bound conditions that tie up the St. Lawrence for the major portion of the year?

Observe the open and closed season along the Lake Erie ports and the ports of Lake Superior, and observe also how even Montreal, which is a great rival of American ports, has its closed season.

Can it then be the real objective of the Westerners to obtain this quick delivery to Liverpool, as indicated? And would any ten cents difference by rail to ports like Boston, New York or Philadelphia in any way compensate for the fierce cost of getting ships to and fro from such extreme Northwestern inland ports?

ASSOCIATION OPPOSES PROJECT

The Atlantic Deeper Waterways Association at two conventions, after very careful consideration of the Canadian waterway project, has passed resolutions solemnly opposing it, not because of any sectional feeling, and not altogether because such a vast expenditure would undoubtedly halt all intra-United States projects, but because the whole scheme, except as it may be a water-power scheme, is chimerical from a commercial and navigation point of view.

Of course, we want to encourage shipbuilding on the Great Lakes, and of course we desire to give every facility of transportation to the grain-raiser of the Northwest, but he already has at his disposal, if he desires to use a water route, the existing and completed New York State Barge Canal, which carries him from Lake Erie to the port of New York. New York has spent

approximately \$150,000,000 to establish this United States waterway for the use of the people of the Northwest, as well as for those of Canada. It received no assistance from the United States Government. It is capable of service and has been rendering service, affected somewhat prejudicially by a wartime transportation ruling, for which New York was not responsible, that barge rates should not be less than railroad rates — a matter which might be adjusted if the proper authorities were appealed to.

But as to the Great Lakes-St. Lawrence project, any one who has been studying waterways in the United States and observing the very great indifference of the Federal Government to their proper development and utilization, might justly ask: "Why this sudden and intense interest in a foreign project which proposes to tax the Federal treasury to the extent of \$250,000,000 at the start?"

La Presse of Montreal of March 11, 1922, quotes from American speakers and Journals and then closes its editorial entitled "Le Chat Sort De La Poche" as follows:

Il faudrait être singulièrement aveugle pour ne pas apercevoir les dangers sans nombre dont nous menace ce projet "des Grands Lacs à la Mer".

Si jamais nous avons pu conserver quelque doute, ce qui se passe en ce moment nous convaincrat de la nécessité d'opposer à ce projet un refus absolu de la part du Canada.

The foregoing may be translated as follows: "One must be singularly blind not to perceive the countless dangers which menace us in this project 'from the Great Lakes to the Sea'. If we have ever had any doubt, that which has now transpired would convince us of the necessity of opposing to this project an absolute refusal on the part of Canada."

Editorial Insertion Showing that the Province of Quebec is Strongly Opposed to St. Lawrence Project

On March 21, 1922, a delegation of distinguished representatives of the city councils of Montreal, Quebec, Hull and Aylmer and of the Board of Trade of Montreal and Shipping Federation of Canada called upon Hon. W. S. Fielding, Minister of Finance, Acting Premier, and Hon. W. R. Motherwell, Minister of Agri-

culture at Ottawa, to urge the Georgian Bay Canal scheme instead of the St. Lawrence power project. The following report of the conference is from the *Montreal Gazette* of March 22, 1922 :

GEORGIAN BAY CANAL SHORTER IN DISTANCE AND TIME CONSUMED—AVOIDS INTERNATIONAL TROUBLE

The delegation was introduced by W. A. Mitchell (St. Antoine), and H. M. Marler (St. Lawrence-St. George).

Colonel Gear, representing the Montreal Shipping Federation, said the St. Lawrence deep water project would do incalculable damage to Canadian shipping, and would result in delay in navigation through holding back the flow of the ice each spring. He instanced the cost as another objection, and intimated that the power development would benefit the United States more than Canada. He urged that the Government study the report of the Shipping Federation made to the International Waterways Commission.

Stanley Cook, Montreal Board of Trade, and C. H. Catelli, Chambre de Commerce of Montreal, supported Colonel Gear. They urged that the St. Lawrence River development would give the United States too great a right in Canada. It was not feasible to make lake ports accessible to ocean steamers. Mayor Samson, Quebec, declared the project was against the best financial and economic interests of the country. Mr. Prudhomme, treasurer, Montreal Chamber of Commerce, said the United States supported the scheme in order to secure more electric power.

Mr. Bertrand, president, Hull Chamber of Commerce, was always in favor of reciprocity, but drew the line at having much in common with the United States. The Georgian Bay Canal, as an all-Canadian project, was far better. He would fight for a free Canada.

NO APPROPRIATION IN 1922

Mr. Fielding regretted the absence of the prime minister. There would be no millions appropriated for the St. Lawrence River project this year. The cabinet had not seriously considered the project as yet. There would be ample time for all bodies to present their arguments. If the United States wanted it, Canada, as a good neighbor, would have to consider it, but only with consideration for the best interests of the Dominion.

The delegates submitted the following resolution:

"Whereas the International Joint Commission has recommended that Canada enter into a treaty with the United States for joint carrying out of combined water power and navigation development of the St. Lawrence, on the basis of a report made to the Commission by its board of engineers;

"And whereas Premier Louis Alexandre Taschereau has publicly voiced the strong feeling of Quebec against alienation of any Canadian rights in the province;

"This deputation heartily concurs in the statement of Premier Taschereau, and respectfully protests against any international agreement being entered upon, as proposed by the joint commission for the following among other reasons:

"(1) The proposals involve sacrifice of national control of the St. Lawrence waterway as a navigation route.

"(2) No sufficient data as to cost have been submitted on which such an international agreement could be safely based.

"(3) There is no evidence to show that any economic gain would result to Canada in any way commensurate with the cost.

"(4) The expenditure contemplated is therefore not warranted, especially in view of the present financial position of the country.

"ALL-CANADIAN ROUTE

"The deputation would further urge that in case any expenditures are to be made upon waterways between the Great Lakes and the Atlantic, first consideration shall be given to the all-Canadian route via Ottawa to Georgian Bay, known as the Georgian Bay Canal, which is without engineering difficulty, and can, at half the cost of the St. Lawrence route, be improved so as to afford efficient deep water navigation, 300 miles shorter in distance than the St. Lawrence, and 30 hours in time—entirely within Canadian territory, capable of developing valuable natural resources in northern Ontario and Quebec, and altogether free from international entanglements."

ST. LAWRENCE PROJECT NOT APPROVED IN CLEVELAND

In the opinion of a majority of a committee of the Cleveland Chamber of Commerce the economic value of the Great Lakes-to-the Atlantic deep waterway in handling the transportation of the middle west has not been proven. Its Board of Directors recently reported that the whole question should be given the further and complete study that its magnitude and importance demand.

Commenting on the specious arguments of some of the advocates of the St. Lawrence project, the *Buffalo Morning Express* said recently that

"The growth, population and wealth of the Middle West have no more bearing on this question than have the growth, population and wealth of California or Louisiana. New York, Pennsylvania and New England also have shown very fair progress in the last half century. Neither the Middle West, California nor the East owes its growth in population and wealth to the St. Lawrence waterway, although there has long been a St. Lawrence waterway in existence. Moreover, at the time of its successive constructions and reconstructions it was as well adapted to the shipping of the day as the proposed enlargement is adapted to the shipping of the present day.

"The one question on which the entire St. Lawrence plan depends is whether the proposed canal will afford a cheaper transportation route to Europe. Quoting the census figures on the population of the Middle West gives no answer to that question. Guessing that a third of the people imagine it will benefit them gives no answer to the question, even if the estimate of their number is correct. The only honest answer to this question must be found by calculating the time which a ship will require to make the voyage from ocean to lake ports through the proposed waterway; the amount of cargo it can carry; the cost of the trip in wages of crew, tolls, upkeep, interest on the money invested, etc. From that data the minimum rate which a ship must charge can be easily calculated.

"If ships could not use this canal at rates less than can be made by existing transportation routes, it is obvious that the people of the Middle West could derive no benefit from it, whether they number 40,000,000 or 400,000,000. If they could not benefit from it, they should not be allowed to spend their own and other people's money to build it merely because some power promoters have been trying to argue them into it. The mere fact that the proponents of this enterprise never can be brought to face the essential point, but always assume that the profit can be taken for granted, ought to be sufficient warning to the wise.

"But perhaps the people of the Middle West are not really so gullible as are their politicians. The Cleveland Chamber of Com-

merce, after an investigation, has refused to indorse the St. Lawrence plan on the ground that its economic value is not sufficiently proved. That may be an eye-opener for those who think that the Middle West already has been sold."

NAVIGATION ON THE ST. LAWRENCE A MONTH LATER THAN ON THE GREAT LAKES

A bulletin recently issued by Sir R. F. Stupart, Director of the Meteorological Service of Canada, states that "navigation on the Great Lakes usually opens early in the month of April (this year it opened on Lake Erie on April 1st) and in the St. Lawrence River and Gulf by April 30th." It thus appears from official sources that the St. Lawrence is not open for navigation until a month after navigation has opened on the Great Lakes.

THE NEW ENGLAND COMMISSION ON FOREIGN AND DOMESTIC COMMERCE OPPOSES THE ST. LAWRENCE PROJECT

The Joint New England Commission on Foreign and Domestic Commerce recently announced that it had voted to oppose the St. Lawrence waterway project. The commission expressed the opinion that the scheme for deepening the river for vessels of large draft was not practical, and that the benefits to the west could not compensate Massachusetts for her loss of freight and shipments.

The commission represents the consolidated membership of similar organizations in the New England States, which were organized some time ago at the suggestion of former Governor Coolidge.

APPENDIX G

FEDERAL AND STATE POWER LAWS

Twelfth Annual Convention of the New York State Waterways Association, Held at Albany, N. Y., October 27th and 28th, 1921

Paper Prepared by Hon. George Clinton of Buffalo

FEDERAL AND STATE POWER LAWS

Twelfth Annual Convention of the New York State Waterways Association

The subject of these remarks is the existing conflict between Federal legislation, known as the Federal Water Power Act, approved August 8, 1917, and the State Water Power Act, chapter 579 of the Laws of 1921, an amendment to the State Conservation Law. The questions involved are of most serious consequence, for upon their determination depend vital questions of the limits of sovereignty vested in the Federal Government and the sovereignty retained by the State. Subsidiary questions, bearing on the exercise of any powers the general Government or the State may have, are those affecting the rights of riparian owners. In this paper I shall use the word "Government" as meaning the Federal Government, and as the legislation of the State of New York is most particularly concerned, I shall use the word "State" as meaning the State of New York.

We must keep in mind that the Government has no sovereign powers whatever except such as have been confided to it by the states through the medium of the United States Constitution, all other sovereign powers and duties being reserved. This has become a settled rule of law through many decisions of the Supreme Court of the United States. Hence inquiry as to the source and extent of the Government's sovereign powers over streams and other inland bodies of water becomes necessary; its control over tide waters is not directly involved in this discussion.

The only provision of the Constitution of the United States under which it can be successfully claimed that Government control over inland waters exists is subdivision 3 of Section 8, Article 1, which vests Congress with the power "to regulate commerce with foreign nations, and among the several states, and with the Indian tribes." The original meaning of this constitutional provision was simply to "regulate commerce" and it was intended to prevent discriminations between states (so far as it relates to states), rivalries and discord.

That the above statement as to the intent of the constitutional provision and the meaning of the word "regulate" is correct appears if we refer to the arguments made by those who advocated the adoption of the Constitution at the time of its inception. Their views not only show the intent of the writers, but, plainly, the arguments used to induce the confederated states to institute a substantial central government, and they may therefore be taken as representing the understanding of the representatives of the various states in the Constitutional Convention, and in the legislative bodies of the several states which agreed with them. The Federalist is the leading exponent of the understanding of those who framed the Constitution. We may, therefore, refer to it as a reliable exponent of what our forefathers understood they were doing when they conferred upon the Federal Government the power to regulate commerce between the states. In No. 7 of the Federalist (written by Hamilton) we find the purpose of this provision discussed. After illustrating the existing jealousies and disputes between the states, Hamilton uses this language,

"The competition of commerce would be another fruitful source of contention. The states less favorably circumstanced would be desirous of escaping from the disadvantages of local situations, and of sharing in the advantages of their more fortunate neighbors. Each state, or separate confederacy, would pursue a system of commercial policy peculiar to itself. This would occasion distinctions, preferences and exclusions which would beget discontent. The habits of intercourse on the basis of equal privileges, to which we have been accustomed since the earliest settlement of the country, would give a keener edge to those causes of discontent than they would naturally have independent of this circumstance. We should be ready to denominate injuries those things which were in reality the justifiable

acts of independent sovereignties consulting a distinct interest. The spirit of enterprise, which characterizes the commercial part of America, has left no occasion for displaying itself unimproved. It is not at all probable that this unbridled spirit would pay much respect to those regulations of trade by which particular states might endeavor to secure benefits to their own citizens. The infractions of these regulations on one side, the efforts to prevent and repel them, on the other, would naturally lead to outrages and these to reprisals and war." No plainer statement of the object of the commerce clause can be made; that object was to prevent discontent, outrages, reprisals and wars by giving the central government the power to prescribe "regulations of trade." The word "regulation", as used in the Constitution, answers all these purposes if confined to regulation of commerce, and that is certainly the original meaning. In the *Federalist* we also have a statement of the object and effect of the expression "regulation of commerce", by Madison (No. 42). Referring to the commerce clause as embodied in the Constitution, Madison says that if the states, severally, were "at liberty to regulate the trade between state and state, it must be foreseen that ways would be found out to load the articles of import and export, during the passage through their jurisdiction, with duties which would fall on the makers of the latter and the consumers of the former. We may be assured by past experience, that such a practice would be introduced by future contrivances; and both by that and the common knowledge of human affairs, that it would nourish unceasing animosities, and not improbably terminate in serious interruptions of the public tranquillity. To those who do not view the question through the medium of passion or of interest, the desire of the commercial states to collect, in any form, an indirect revenue from their uncommercial neighbors, must appear not less impolitic than it is unfair; since it would stimulate the injured part, by resentment as well as interest, to resort to less convenient channels for their foreign trade. But the mild voice of reason, pleading the cause of an enlarged and permanent interest, is but too often drowned, before public bodies as well as individuals, by the clamors of an impatient avidity for immediate and immoderate gain."

The decisions of the Supreme Court of the United States fully bear out the proposition I have stated, namely, that its original intent was to vest in the central Government power merely to

"regulate" commerce, in order that discord and perhaps war between the states might be avoided and trade between the states and with foreign nations governed for the best interest of all.

In construing the provisions of the Constitution, powers necessary to enable the Government to exercise the powers intended to be conferred will be implied, but constitutional power cannot be given to the Federal Government by implication where that is not necessary to the performance of the duties imposed and the exercise of the powers plainly and expressly conferred. This is the purport of the decisions of the Supreme Court of the United States: (See *Lake County v. Rollins*, 130 U. S. 670; *Houston v. Moore*, 5 Wheat. 48, approved *Keller v. U. S.*, 213 U. S., 138).

The Supreme Court of the United States, however, following the line of assumed necessity for Federal control over the instruments of commerce, has, by implication, greatly extended the meaning of the words, so that now it is the settled law that under the provision quoted the legislative power extends to navigation as necessary to regulation of commerce and hence to control and improvement of waterways. This extension of the meaning of the words really gives to the Government sovereign powers not expressly given in the Constitution. It follows that the Government may, by legislation, absolutely control the obstruction and diversion, not only of the public navigable waters of the United States, but of their tributary streams, for the tributary streams are really a part of the system as any particular navigable waters, inasmuch as they supply the waters needed for navigation purposes. The vastness of the power under existing decisions brings up a multitude of questions which, although they should be governed by the United States Constitution and general principles of the common law, remain undecided. The result is direct confusion between the right to exercise the government's powers and the rights of riparian owners and owners of lands under water and the sovereign rights of states. The decision of these questions will require final decision in each instance by the Supreme Court of the United States, and it is to be hoped that that court will recognize the extreme danger which has arisen, of conflict between the sovereign rights of the states and the claimed sovereign powers of the Government. If the lines of divergence from the Constitution laid down by some of the early decisions and since carried to an alarming and unwarranted extent by Congress are followed to their logical ends, there will be involved most

serious and disturbing results affecting not only the control, improvement and use of navigable waters, but interference with the sovereign rights of the states in the creation, regulation and control of public utilities, which may incidentally be connected with interstate commerce, in the exercise of corporate powers. Such a course will also involve the conflicting rights of the states and the Government in the exercise of eminent domain by corporations, individuals and associations, and it will raise serious questions as to the invasion of vested rights of riparian owners. Indeed, some of these most serious questions are involved in a direct conflict which arises between the Congressional Power Act and that of the State of New York.

Consideration of the exercise of control over waters navigable and innavigable, by the Government, necessarily involves a multitude of questions which are not germane to the purposes of this paper. Thus, the powers of the Government over waters within territory owned by it exercised in the Federal Water Power Act, have no connection with the attempt by that act to exercise powers which conflict with the sovereign powers of the State of New York.

It is my purpose to limit this paper to a discussion of the Federal Water Power Act, using that as an illustration of the growth of the idea in Congress that sovereign powers of the Federal Government may and should be extended by all means possible, without regard to the legal effect and plain meaning of the language of the Constitution. This abnormal growth of constitutional ideas seems to be an offspring of the exercise of the extra constitutional war powers during the last few years, and the attempt of Congress is to assert extraordinary authority and justify it by sophistical reasoning and the strong arm which was used during the late war. The Federal Water Power Act furnishes a most apt illustration of this spirit and its provisions show the insidious means adopted to stretch the Constitution to justify invasion of state reserved sovereign powers.

It is well that we should determine what are the limits of the sovereign powers that can be exercised over waterways by the Federal Government. Under the decisions of the Supreme Court of the United States it is settled that as navigation is a part of commerce, Congress has control over all that pertains thereto and consequently may improve navigable streams, control diversions from the sources of supply thereof and from those which are

themselves navigable, but this portion of sovereignty given to the Federal Government by the Constitution cannot be construed to permit the exercise of the control beyond the bounds of what is in truth directly connected with navigation. The Federal Government has no constitutional power whatever to engage in commerce directly, nor in manufacturing, and it cannot interfere by legislation with commerce carried on wholly within a state nor with production therein. Until intrastate commerce and production through manufacture, utilization of natural forces, agriculture or mining interferes with the carrying on of navigation and enters into interstate commerce, the Commerce Clause of the Constitution cannot be appealed to successfully as a source of Federal Legislation.

The generation of electric power is not commerce between the states nor with foreign powers, nor with the Indian tribes. It is a separate industry, which like any manufacturing industry may or may not become an essential element, by the use of the product, of commerce. To sustain a claim that it is commerce or an essential element of commerce and therefore within the Commerce Clause of the Federal Constitution, is to claim the establishment of a principle that would make all manufacturing industries subjects of the exercise of Federal control, because their products might enter into commerce between the states or with foreign countries or Indian tribes.

The legal definition of commerce is that it "consists of intercourse and traffic, including in these terms navigation and the transportation and transit of persons and property, as well as the purchase and sale and exchange of commodities." (*County of Mobile v. Kimball*, 102 U. S., 691, page 702.)

In applying this definition the Supreme Court of the United States (*Kidd v. Pearson*, 128 U. S., 1), holding that the State of Iowa had the power to prohibit the manufacture of alcohol for any other than certain purposes which would exclude the right to export if from the State and that the statute was not void for that reason, under the Commerce Clause, uses the following language: "If it is to be held that the term (commerce) includes the regulation of all such manufactures as are intended to be the subject of commercial transactions in the future, it is impossible to deny that it would include all productive industries that contemplate the same thing. The result would be that Congress would be vested, to the exclusion of the States, with the power

to regulate not only manufactures, but also agriculture, horticulture, stock-raising, domestic fisheries, mining — in short, every branch of human industry, for is there one of them that does not contemplate more or less clearly an interstate or foreign market? Does not the wheat grower of the Northwest, and the cotton planter of the south, plant, cultivate and harvest his crop with an eye on the prices at Liverpool, New York and Chicago? The power being vested in Congress and denied to the States, it would follow as an inevitable result that the duty would devolve on Congress to regulate all these delicate, multiform and vital interests, interests which in their nature are, and must be, local in all the details of their successful management. It is not necessary to enlarge on, but only to suggest the impracticability of such scheme, when we regard the multitudinous affairs involved, and almost infinite variety of their minute details."

The court quotes from and follows the principles announced in the leading case of *Gibbons v. Ogden*, 9 Wheaton, 191. Its conclusion was that the Commerce Clause did not apply to the manufacturing or other producing of the subjects of commerce until they entered into traffic or transportation between the states or to, or from foreign countries, but that they were wholly within the sovereign jurisdiction of the individual states in which the manufacturing or producing takes place. It cited with approval the opinion of Mr. Justice Bradley in *Cole v. Errol*, 116 U. S., 517, where the learned Justice lays down the rule (following *The Daniel Ball*, 10 Wall., 557, page 565) that "whenever a commodity has begun to move as an article of trade from one state to another, commerce in that commodity between the states has commenced;" but adds to that rule the statement that "the movement does not begin until the articles have been shipped or started for transportation from one state to another."

The gist of *Kidd v. Pearson* is the decision that the police power of the state is broad and plenary, and that as to the mass of property within a state, as to its production by manufacture or otherwise, that police power is not limited in any way by the Commerce Clause of the United States, and that that clause does not attach until the property becomes the actual subject of interstate or foreign commerce. This decision is cited with approval in *Newberry v. United States*, 41 S. C. R., 469, p. 474.

The Government may prevent or permit the diversion of water but it cannot invade the sovereign right of the state to create and

control corporations and to control and limit the rights or duties of individuals and associations in the use of water of our navigable or other streams for power or other purposes.

The Government cannot constitutionally fix rates to be charged for electric power that has not entered into interstate commerce; that is within the police power of the state. If the production of the power is by a corporation the fixing of rates is a regulation of the corporation and a conferring or restricting of corporate powers and it is an invasion of the states' sovereign police power. The same thing is true if the electric power is generated by individuals or associations so far as the sovereign right of the state to regulate and control them is concerned. The rate making power is a necessary part of the exercise of sovereignty by the state over its own corporations, its citizens and associations, in matters which affect government within the state and which are not commerce between the states. Electricity is individual property, because it is in every sense a product of the efforts of individuals as applied to the segregation and individual use of a natural force. By machinery it is produced, confined, transmitted and delivered by the producer to the purchaser and consumer. It may or may not become an element in commerce between the states or with foreign nations. Its production and use may be limited entirely to the territory of the particular state. Like the product of the mine or of the field it is the result of the application of human intelligence and labor to the matter and forces of nature. The farmer plants seed and puts the vital forces of nature at work, the result being the production of more seed which can be put to use directly by human beings and utilized to set the forces of nature again at work. In mining the raw material exists in the earth, just as electricity exists potentially, and the miner simply takes what nature has created, his product being directly utilized by change, mechanically, chemically or electrically. There is perhaps a distinction between such purposes and the production of electricity, but it is a distinction without a difference. Just what electricity is we do not know, but we do know that it is a potential natural force and we do know that we can produce it in different quantities and with different intensities and set it to work on matter so as to produce changes therein. We can produce electricity and sell it or use it to create light, heat and power, and with the aid of light, heat and power we can produce changes in the conditions of matter as will make it the

concrete subject of manufacture and of barter and sale. It is as truly a product strictly analogous to manufacture of raw material into finished products as the production of coal for the same purpose. This being so, the electricity produced may or may not come within the power of the Government to regulate, accordingly, as it is utilized wholly within the state or becomes the subject of commerce between the states or with foreign nations.

One material question has not been directly decided by the Supreme Court of the United States; that is to what extent does the Government obtain the right to the use or disposal of power which may be made available by its construction of dams erected in aid of navigation.

Another vital question is whether, inasmuch as the Government has the paramount right to permit or prevent diversion of waters, it can annex to permits conditions not relating to navigation, but to the utilization of water for power purposes.

We may consider the second question suggested, first. The constitutional power of the Government being limited to what directly affects navigation, and not extending to any industry whatever that is not actually engaged in commerce, nor to the products of such industries until they become factors in commerce and it having no proprietary interest in the water, it is quite apparent that the Government has no control whatever over waters of navigable or innavigable streams after it has been diverted, unless power generated by the diversions is transmitted in such a way as to be an element of commerce between the states or with foreign nations or Indian tribes. Thus, as a condition of permitting the diversion of water (where the Government has a right to restrict) the Government can make regulations with respect to transmission through one state to another, but I cannot conceive any power whatever in the Government to fix the price to be charged for use within the state in which it is generated any more than it can, the price to be charged for anything produced within a state that is sold therein to be delivered in another state. The limit of the Government powers is the right to regulate commerce and, so far as navigation is concerned, to protect and improve navigable streams in aid of interstate or foreign commerce. The doctrine that inasmuch as the Government can forbid diversion from navigable waters, it can also permit diversion and the sophistical conclusion arrived at that as it has the power to permit, it can annex any conditions on the use of water when diverted, is purely sophistry and an insidious argu-

ment advanced for the purpose of securing through act of Congress uniformity in the utilization of water powers of the nation. It amounts to an assertion that Congress, having been given no authority whatever over the creation of water power, can still acquire that power by Congressional legislation or judicial construction of other and essentially different powers granted. The adoption of such a theory is absolutely destructive of the limitations put upon Congressional action by the Constitution itself. Article X of the Constitution of the United States distinctly states that "the powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." That clause was inserted in the Constitution to make certain that the specific powers granted should not be extended by implication, and the argument to which I am now referring, when carried to its full extent, would ignore it and destroy the police power of the States and confer it upon Congress. I deem it an inevitable conclusion, and one absolutely necessary to preserve the vitality of Article X, that no power exists in the Government to annex conditions to permits for the diversion of water other than such as are necessary for the preservation of navigation, and the increase of navigable facilities. This excludes any power whatever to make any regulations regarding the use of waters once permitted to be diverted.

As I have said, the extending of Congressional power beyond the terms of the constitutional grants by implication and sophistical argument based on what ought to be done, is to fly in the face of the Constitution itself, is subversive of our Government and destructive of the reserved rights of the States; it is, indeed, an insidious change of our form of Government and therefore it is revolution.

The Government has no proprietary right in any of the waters that comes within the purview of the Commerce Clause is an admission that the water is not needed for navigation purposes, we must necessarily conclude that, as the Government does not own the water, it has no interest in that which is diverted from the time that it ceases to be a part of navigable waters, and that, therefore, the Government can have absolutely no control over it, its use or its sale or other disposal; all the power left in the Government, as soon as it determines that the water may be diverted and assents to it becoming unnavigable, is to provide for revocation of the right to divert thereafter and to regulate the

times and quantities of diversion so as not to interfere with navigation, also to impose any other reasonable regulation for protecting the full navigable capacity of the navigable stream or the full supply of water if the stream is an innavigable tributary.

The government has no proprietary right in any of the waters of the United States, nor has any State or individual. Flowing water is not the property of any Government, but the sovereignty has control in trust for the benefit of the public and that control in case of the Government is limited to control for purposes of navigation in interstate, foreign and Indian commerce. All other control rests in the several States.

This was the common law and is the accepted law of the United States. In the final report of the National Waterways Commission (62d Congress, second session), this question was considered. The Commission concluded, on authority, that "the Federal Government has no proprietary right or interest in navigable waters which would authorize the collection of tolls."

The Court of Appeals of our State has quite clearly stated the rule in the following language: "Neither sovereign nor subject can have any greater than a usufructuary right therein (running waters), and even this is subject to the temporary enjoyment by the riparian proprietors over whose lands it passes while on its way to its final destination, undiverted and undiminished, save for domestic or manufacturing purposes. Thus all land covered by running water is subject to servitude, either dominant or servient, and all interest in such water is simply an easement, incapable of fixed appropriation or conversion."

Smith v. City of Rochester, 92 N. Y. 467, page 480.

It is quite apparent that as the Government has no proprietary interest in waters, but simply the sovereign power in trust over them to the extent granted by the Commerce Clause, as the moment a permit to divert is granted and the diversion takes place, the water passes wholly from the control of the Government and it cannot make any charge therefor; it never had anything to sell and a simple permit to use amounts to an assertion only that the water is not needed for navigation, and cannot confer any right of ownership that legally or morally entitles the Government to charge for the water itself. Of course if the Government expends money for the benefit of the person receiving the permit to enable him to divert the water or facilitate the diversion, a reasonable charge can be made for such service.

The Government cannot, under disguise of making improvements in aid of navigation, make them for the real purpose of creating electric power. It is not to be presumed that Congress would attempt to provide for the development of electric power through the deceit of claiming that the plant was an aid to commerce between the States, that is, an aid to navigation; but there can be no question but that if the structures plainly do not aid navigation the courts have full power to examine into the facts and declare any Congressional action authorizing their erection void as being the exercise of power not granted by the Constitution.

That the Supreme Court of the United States has power to look beyond the mere words of a Congressional act to ascertain whether the power of legislation is being constitutionally exercised would seem to be settled. Chief Justice Marshall says, "Should Congress, under the pretext of executing its powers, pass laws for the accomplishment of objects not entrusted to the Government, it would become the painful duty of this tribunal, should a case requiring such a decision come before it, to see that such an act was not the law of the land."

The same eminent jurist in *Marbury v. Madison*, 1 Cranch 137, page 178, says, "Those, then, who controvert the principle that the Constitution is to be considered, in court, as a paramount law, are reduced to the necessity of maintaining that courts must close their eyes on the Constitution, and see only the law."

"This doctrine would subvert the very foundation of all written constitutions. It would declare that an act, which according to the principles and theory of our Government, is entirely void, is yet, in practice, completely obligatory. It would declare that if the Legislature shall do what is expressly forbidden, such act, notwithstanding the express prohibition, is in reality effectual. It would be giving to the Legislature a practical and real omnipotence with the same breath which promises to restrict their powers within narrow limits, it is prescribing limits and declaring that those limits may be passed at pleasure."

POWER OF THE GOVERNMENT OVER IMPOUNDED WATERS

This is the question heretofore stated as not having been decided, namely, "To what extent does the Government obtain the right to the use or disposal of power which may be available by its construction of dams erected in aid of navigation?" As the ob-

ject of this paper is the discussion of the conflict between the powers of the Government and those of the State arising from the Federal and State water power acts, I shall not enter into an investigation of the rights of riparian owners; it is sufficient to say that those rights are under the control of the State, this control having been recognized by the Supreme Court of the United States.

See *Port of Seattle v. O. W. E. Co.*, 41 Sup. Ct. Rep. 237. The control of the State over such rights being subject only to the paramount control of the United States when navigation is or may be interfered with, or when improvement of navigation is deemed advisable by Congress. It is well, however, to note that as Congress has the right to provide for improvements of navigation being made by private persons or corporations and has the further jurisdiction to confer upon them the right to utilize any water power which may be generated, it is a serious question whether this can be done without providing for the condemnation of riparian rights where they exist. I know of no decisions which can be said to determine this, although there has been a tendency toward holding that the Government, having the right to improve navigation, riparian rights to the use of the water are subject to the paramount rights of the Government under the Commerce Clause.

Chandler-Dunbar Water Power Company et al. v. The United States (229 U. S. 53, 33 S. C. R. 667) has been cited by some as authority for the proposition that the Government when improving a navigable stream can destroy riparian rights without compensation, but that case does not hold any such doctrine, although it seems to apply it under the peculiar circumstances of the particular case; its application was not necessary, inasmuch as the shore lands were condemned by the Government and any riparian rights which existed were consequently acquired by it. It simply asserts the paramount right of the Government to improve navigable streams without compensation for use of the bed and without regard to the fact that the improvement prevents the use of the waters of the stream by the riparian owner. What will be the final decision of this question is not clear, but it is not germane to the purposes of this paper.

The question involved here is, can the Government, having impounded water by the construction of a dam in a navigable stream, deprive the State of full control, under its police powers,

of the corporation or individual using the waters for power purposes by permission of the Government, by the imposing of regulations as to the use where the use of the impounded waters by the Government is not affected, or by increasing the powers of such corporation or individual, or by the fixing of rates to be charged for electricity generated, or by other means that limit the exercise by the State of its powers of local control. There is absolutely no decision of the Supreme Court of the United States directly upon this point, but it is clear from the fact that the Government has no proprietary interest in the water, has no power over the production of electricity once the water is permitted to be diverted and certainly has no right or power to increase or diminish the powers of corporations or individuals, as controlled by State legislation, and has no power to fix rates to be charged, that being wholly within the police powers of the State, that the Government can impose no regulations not required by the proper use of the waters impounded for purposes of navigation. This I have, I think, quite clearly shown in my prior discussion of the law and the questions involved in the case of diversion of waters where no dam is constructed.

It seems pertinent here to refer to a report by Mr. Stimson, then Secretary of War, in 1912, in this connection. He stated that the Government had a proprietary interest in water power developed by dams constructed for the improvement of navigation. In making this statement he relies upon *Green Bay Canal Company against Patten Paper Company*, 172 U. S. 58. That case does not decide any such thing. In this connection I take the liberty of quoting from an article by Mr. Rome G. Brown, published in *Case and Comment*, No. 10, March, 1913, cited with evident approval by George Fillmore Swain, L. L. D., in "Conservation of Water by Storage," a compilation of addresses delivered by him in 1914 before the senior class of the Sheffield Scientific School of Yale University. Mr. Brown says:

"The Secretary of War and Senator Burton refer to this question as 'settled' by the decision in *Green Bay & M. Canal Co. v. Patten Paper Co.*, 172 U. S. 58; 43 L. ed. 364; 19 Sup. Ct. Rep. 97; 173 U. S. 190; 43 L. ed. 663; 19 Sup. Ct. Rep. 316. An examination of this case shows clearly that it does not support any such contention. It is true that it was held in that case that the water power created by the dam in question was incidental to the naviga-

tion improvement and was subject to the control and appropriation by the United States; but such power of control in the United States was not based either upon the fact that it was a navigation dam, or upon the fact that the water power in question was created incidentally to a navigation improvement. The conclusion in that decision was based expressly upon the fact that, by reason of certain conveyances from the private owners of the water power in question to the United States and confirmed by State legislation, both the private right and the right of the State had passed to the United States as proprietor.

"It has never been settled by any Federal decision that the Government could appropriate to itself, or for its benefit, revenues from water power, by virtue of a right arising solely from its constitutional power to regulate navigation, nor in any other case except where it had acquired the proprietary rights of either the individual riparian owner of the State, or of both."

Kaukauna Water Power Company against Green Bay and M. Canal Co., 142 U. S. 254, has been referred to in the past as sustaining the proposition that where a dam is constructed in order to use the water for a public purpose, a proprietary right in the water power is created. The case holds no such proposition. It simply decides that where a dam is built for the bona fide purpose of furnishing water to a public canal, the State (or Federal Government) has entire control over the water impounded. It was further held that as the structures were erected by an improvement company, the property and franchises of which were subsequently conveyed upon foreclosure of a mortgage to the United States, reserving the right to the surplus water power created by the dam, together with such rights and privileges in the land as were necessary to the enjoyment thereof, the duty to make compensation to the land owner followed the public use and the United States became liable therefor. There is nothing in the case to the effect that the Government acquired any proprietary use in the water.

Consideration of a multitude of decisions bearing, directly and indirectly, upon the legal questions I have discussed, results in finding that the Supreme Court of the United States has not at any time decided that the Government has any proprietary interest in the waters of a navigable or unnavigable stream, nor is

there any decision of that court which directly or indirectly holds that the Government has any proprietary interest in power generated by water diverted from such streams. On the contrary all the authorities are to the effect that there is no such proprietary interest in the water and it follows as a necessary conclusion, borne out by the reasoning of the Supreme Court in many cases, that when water is not navigable, either on account of its natural innavigability or by its diversion from navigable waters without objection by the Government, or with its permission, it ceases to be navigable waters and passes from the control of the Government absolutely, except so far, as I have stated, as it may become necessary to improve the navigable waters from which it is taken or to restore them to their navigable capacity, and except so far as the Government has the necessary supervision for the purposes stated.

The logical conclusions from all authorities and decisions are as follows:

I

Neither the Government nor the State has any proprietary interest in waters, navigable or innavigable.

II

Neither the State nor the Government can charge for the use of waters when actually diverted for power purposes.

III

The Government can control the use of waters diverted from navigable streams or their tributaries to the extent only that it is necessary for the preservation of navigation to its fullest extent or for improvement of the navigability of a navigable stream.

IV

The Government may charge users of diverted water for expenses that it may be put to by reason of the diversion and use of the waters and for services rendered, and, logically, it is entitled to charge for the creation of surplus waters diverted where the waters of the stream could not otherwise be utilized, or could not be utilized to the same extent, were it not for the erection of a dam or other structures. Undoubtedly the Government may charge for the use of any of its property by the user of the

diverted water. The right to charge does not depend upon proprietary interest in water or power, but upon other considerations.

V

The law therefore is that the Government can not impose any conditions or regulations for the use of diverted water, whether the diversion is direct or from waters impounded by dams or other structures; it can make regulations for the protection or improvement of navigation only.

VI

It further follows that the State having exclusive control over the users of diverted water it alone can regulate rates and impose conditions not affecting navigation.

The issue between the Federal Government and the State of New York is presented by the Federal Water Power Act and that of the State, both of which have been referred to. It is undoubtedly true that many of the provisions of the Federal Act may properly be construed so as not to infringe upon the reserved sovereign powers of the State, but the act is so plainly intended to provide a sweeping system for controlling the generation of electric power, and contains so many provisions which are beyond the constitutional authority of Congress and that are in violation of the reserved sovereignty of the State, it would seem that the valid and void provisions cannot be separated and that the entire act is therefore a nullity.

It is impossible within the limits of this paper to consider every instance in which the Federal act conflicts with that of the State, or every provision that is an excess of the constitutional powers vested in Congress and an invasion of the sovereignty of the State. I shall therefore confine myself to the most important and glaring instances of provisions that are extra-constitutional and which present the plainest examples of usurpation based on an insidious attempt to expand the Federal Constitution by enactments resting on sophistical reasoning. This method of grasping for power is to be condemned and resisted energetically. If, in order to provide a uniform system regulating water powers it is desired that Congress should be given greater authority, the Constitution should be amended in the manner which it provides.

No one can read the Federal Water Power Act without at once recognizing the humiliating position in which it puts the respective States. The States are placed on the same footing as

individuals and must humbly apply to a Commission appointed under the authority of Congress for leave to generate electric power from streams within its own territory. It is true that when they apply to the Commission they acquire a preference in the granting of permits, but they must comply with the rules and regulations of the Commission and the requirements contained in the act. This situation is the result of the attempt of Congress to usurp the sovereign powers of the States, and it furnishes a complete answer to the devising of any universal system of control over water power by the Federal Government; no such system can be devised that will not subject the States, when they desire directly to generate electricity by water power, to Federal dictation by Congressional legislation and by authorities constituted through delegation of Congressional powers. What can be found in the Constitution, even by the exercise of the most vivid imagination, that gives or anticipates the subordination of a sovereign State to direct legislation by Congress? The idea is absolutely repugnant to our form of Government; it would place the States in practically the same relation to the Federal Government that counties and municipalities bear to State governments, and the idea of State sovereign reserved powers would be extinguished.

The provisions of the Federal Water Power Act, to which I refer in this connection, are those which give the States and municipalities preference, but does not in any respect relieve them from complying with the requirements of the act itself and the rules and regulations which the Commission may adopt.

Specific glaring instances of violation of the reserved sovereign powers of the States are to be found in the following sections.

I

Subdivision d of section 4 gives power to the Commission to issue licenses to citizens, associations, States, municipalities and to corporations of the United States or States operating and maintaining dams, water conduits, reservoirs, power houses, transmission lines or other projects necessary or convenient to develop and improve navigation and the transmission and utilization of power, or for the purpose of utilizing the surplus water or water power from any government dam, with certain exceptions. This broad power vested in the Commission includes all navigable waters by its terms and delegates absolute control over

all water therein when used for power purposes. The limitations of the power are that when the Commission concludes that a contemplated improvement is justified to improve or develop any water or waterways for the benefit of interstate or foreign commerce, the Commission shall make a finding to that effect. Another proviso is that if the Commission finds that any Government dam "may be advantageously used by the United States for public purposes *in addition to navigation* a report is to be made to Congress of the fact and no license issued until two years thereafter." It is apparent that this subdivision is intended to permit the Government's producing and dealing in hydro-electric power irrespective of the requirements of navigation. No such power has been given to the Government by the Constitution.

II

Subdivision f of section 4 places the business of all licensees directly under the supervision of the Commission. This power is one which conflicts with the exclusive supervision of the several States over the generation, transmission and sale of power within the State.

III

Subdivision g of section 4 relates to hearings for the purpose, among others, of regulating rates, service and the issuing of securities by those who receive permits. This subdivision shows plainly that the intent was to vest the Commission with all the power necessary to enable it to regulate, and when taken in connection with the other powers given by the act, emphasizes the usurpation by Congress of the exclusive power of the States to regulate rates, service and the issuing of securities by corporations, individuals and associations. It also subjects the State to control and regulation as to rates it may charge, the service it may render and the securities it may issue, where it engages directly in the generation, sale and distribution of water power within its own territory; a gross violation of the State's sovereignty.

IV

Section 6 provides that all licenses shall be upon condition that the licensee accepts all the terms and conditions of the act. This is a confession that Congress has not the power to impose upon licensees the terms and conditions which the act does and it

is an attempt to supply the absence of power by reducing to a matter of agreement with licensees the terms and conditions which Congress would insist on. As I have shown, Congress can not impose any conditions upon granting a permit that have no direct relation to the protection, aid or improvement of navigation; it has no constitutional authority to impose regulations governing rates, service or capitalization for they have no relation to navigation, but merely to the generation of electricity and sale; the respective States, alone, have power to control these public utilities within their borders.

V

Section 7 takes the act beyond the bounds of navigation, for it, in so many words, includes "water resources of the region" within those provisions of the section which relate to the issuing of preliminary permits and to licenses. Thus it assumes control of all the water resources within a State whether it has any connection with navigation or whether it has not, whether it can become a medium of interstate or foreign commerce or whether it can not, and it deprives the State of its control of such matters, attempting to carry the authority of Congress entirely beyond that given by the Commerce Clause of the Constitution.

This section purports to give preference to States, in the issuance of permits. It will be noticed that this subordinates the States to Congress and its Commission, inasmuch as it attempts to give it a preference in the utilization of waters for purposes over which it has sole control. In effect it would unconstitutionally deprive the State of its exclusive control and then benignly say, however, "We recognize that you ought to have a preference when we condescend to grant a permit to do that which you could legally do if we had not, without warrant of the Constitution, deprived you of your sovereignty," for it assumes control over all "water resources of the region."

VI

Section 8 prohibits the transfer of licenses without the approval of the Commission. This invades the police powers of the States, as it has exclusive control over transfers of property and property rights within its boundaries. All the Government can do is to permit the diversion of waters for power purposes, where navigation is affected, and the rights of property attach only when the power is used, those rights at once coming under the exclusive jurisdiction of the State.

VII

Section 10 details the conditions which must be imposed upon licensees. This entire section is evidently intended to rest upon the sophistical theory that where Congress has not the power directly to regulate the use of water, it may do so by refusing to grant permits unless certain conditions are annexed to them which are agreed to by the licensee. Congress has no power over the waters of any streams except so far as they are instruments of navigation and their use for power purposes is subject only to regulation and conditions relating to navigation. The legal right to impose conditions not in aid of navigation does not exist, and to say that no permit shall be granted unless conditions are imposed which cannot be imposed directly is simply to use brutal force to evade the Constitution and insidiously to usurp the sovereign powers of the several States.

VIII

Subdivision a of section 10 imposes as a condition of granting permits that the project (the entire plan for development of power) "shall be best adapted to a comprehensive scheme of improvement and utilization for the purposes of navigation, of water power development and other beneficial uses." In other words, this subdivision contemplates water power development and undefined beneficial uses in addition to navigation. A clearer statement that the purpose of the act is to extend the operation of the Commerce Clause of the Constitution far beyond the limits of commerce and navigation and to assume control of all water power development and beneficial uses cannot be imagined, for the section is not limited to navigable waters, but takes in all the waters of the United States and attempts to give the Commission control of all public utilities that are created by the utilization of water power. I may add that this not only invades the sovereign rights of the States, which have sole control over such matters within their boundaries, but it destroys the right of riparian owners in innavigable waters to utilize them in any manner they see fit so long as they do not reduce the supply of navigable streams of the United States, those rights being subject in no manner to Federal control except to the extent that it may be desirable to impound or divert the waters in order to preserve or increase the supply for navigation purposes of streams wholly within the Federal jurisdiction.

IX

Subdivision c of section 10 provides for maintenance and repair of "project works" by the licensee necessary for the "efficient operation of said works in the development and transmission of power." It also provides for depreciation reserves for such purposes. This is a clear invasion of the police powers of the State; the Government has the right to impose as conditions of a permit that the works shall be kept in condition adequate for the purposes of navigation, but so far as the condition and operation of the plant for the generation of electricity is concerned, no power exists except in the State. Neither has the Government any power over corporations or individuals to compel them to create depreciation reserves except, perhaps, sufficient to protect or aid navigation so far as the works aid or may injure the navigability of the stream.

The same criticisms apply to subdivisions d and e which are regulations of the finances of the licensee. Further, the provisions of subdivision e apply to States and municipalities, placing them under the control of the Commission so far as their finances may be involved in the generation of power; a gross excess of jurisdiction, unconstitutional and plainly illegal, as well as humiliating. Again, subdivision e exempts States and municipalities from the payment of charges to the United States where power developed is used for public purposes. The States and municipalities, by authority of the State, have the absolute right, exclusive of interference by the United States, to the use of all waters where navigation is not affected, and they cannot legally be charged for such use; an attempt to impose upon the State or the municipality a fee for use of the water is an assumption of power beyond any possible extension of the operation of the Commerce Clause of the Constitution.

X

Section 14 gives the United States the right under certain circumstances to "take over and thereafter to maintain and operate any project or projects as defined in section 3 hereof and covered in whole or in part by the license, or the right to take over upon mutual agreement with the licensee all property owned and held by the licensee then valuable and serviceable in the development, transmission or distribution of power and which is then dependent for its usefulness upon the continuance of the

license." As the property may be taken over upon two years' notice in writing from the Commission it gives the Commission the power to appropriate property rights of States and municipalities, as well as private corporations and individuals and is clearly in this respect an excess of authority. Further, it authorizes the Commission on behalf of the Government to engage in the business of generating, transmitting and selling or otherwise disposing of electricity. Where the Government gets any such power is unknown, it cannot be found in the Constitution. If the power were limited to cases where dams had been erected for purposes of navigation, the question would arise as to the right of the Government to generate power for sale, and this, as I have stated, has not been decided.

Another criticism of this section is that it reserves to the United States the absolute right of condemnation and the right to maintain and operate any project licensed under this act. In other words, it authorizes the United States to condemn by eminent domain property of a State or of a municipality for the purpose of maintaining and operating electricity generating plants. By the most strained construction of the Constitution no such authority in Congress can be found. It is true that the proviso reserving the right of eminent domain reserves it for States and municipalities as well as the Government, but this is an unnecessary reservation, because the State has and will have the power and may delegate it to municipalities.

XI

Section 19 compels licensees to abide by regulations as to services, rates, etc., prescribed "by any duly constituted agency of the State in which the service is rendered or the rate charged." So far the section is a mere enunciation of the police powers of the State, but there is a provision therein which authorizes the Commission to regulate, upon complaint of any person aggrieved or upon its own initiative until the State shall have provided a commission or other authority, etc.

This section taken as a whole is a direct invasion of the sovereign powers of the State, for it takes from the State jurisdiction over the regulation of rates and charges where the State has not authorized and empowered a commission or other agency or agencies to regulate and control those subjects and vested it in the Commission. It is a restriction upon the power of the legis-

latures of the respective States to directly by law regulate and control rates, services and charges. It also compels the States, if they would retain control, to create commissions and vest power of control in another agency or agencies; in case no such commission or agency is constituted by a State, the provision of the act is that the Commission shall take charge and exclude the State from exercising its own exclusive sovereign power over the subjects named.

Again the section is unconstitutional because so far as regulation and control by the Commission is concerned it is not limited to navigation purposes and therefore confers upon the Commission authority to invade the police powers of the State, as well as impose upon the State the necessity of vesting its powers in a commission or other authority to regulate charges and service; in other words, it imposes upon the State a condition upon the performance of which only can it exercise its sovereign power.

Section 20 is inoperative for the same reasons that section 19 is. Its provisions are plainly invasions of State jurisdiction, not warranted by the Commerce Clause of the Constitution.

I have not considered all of the sections of the Federal act which exceed the constitutional authority of Congress and violate the reserved sovereign powers of the States, nor have I, in each instance, specified all violations, it being sufficient to say that they are part of the entire scheme and with but few exceptions are subject to the same criticisms that I have made where I have discussed particular sections.

For a number of years past the Legislature of this State has had under consideration the organization of water power generation on the different streams and the perfecting of a system of absolute control by the State over generation and transmission of such power. The result has been the passage of the State Water Power Act in the form of an amendment to the State Conservation Law. The intent of this legislation is quite plainly to vest final control over the use of waters for the purpose of generating power in the State and also to provide State control over transmission and the regulation of rates and service, and is, therefore, in direct antagonism with the attempted usurpation of the reserved sovereign rights of the States and the indefensible provisions of the Federal Water Power Act. However, the State law, by reason of the language used, is ineffectual. This is the consequence of using the word "proprietary" as descriptive of waters,

the use of which for public purposes is licensed and regulated. Aside from waters so described no others come within the purview of the act, except those where the bed of the stream or property required for use of the water is vested in the State, and boundary waters where the State has jurisdiction over diversion or interference with the flow solely or concurrently. The State can have no proprietary interest in any waters of flowing streams, nor impounded or enclosed waters having no outlet, where there are riparian owners other than itself. However, the State Public Service Commissions Law gives the Commission jurisdiction, supervision and certain powers over "the manufacture, sale and distribution of gas and electricity for light, heat or power, to gas plants and to electric plants and to persons or corporations owning, leasing or operating the same." The Commission has power under the act to compel safe and adequate service, just and reasonable charges and to prevent unjust discrimination and unreasonable preference. This State act is in direct conflict with the Federal act, as it asserts the police power of the State which has been infringed upon by Congress. The State and Congressional legislation are therefore in material respects directly opposed, so far as the exercise of sovereign power is concerned.

The questions which I have discussed are so far reaching and so extremely important to the several States of the Union that no time must be lost in securing a decision by the Supreme Court of the United States upon them, that we may know whether there is to be further invasion of the reserved sovereignty of the States or whether the line is to be sharply drawn, as it should be, limiting the powers of Congress under the Commerce Clause.

Dated, October 28, 1921.

GEORGE CLINTON.

Note: I wish to acknowledge the assistance which I have had from Dr. Swain's lectures, referred to above, and also from the pamphlet of Mr. Brown, in the preparation of this paper.

G. C.

Note: Amendments made in 1922 to the Water Power Laws of New York make possible the general distribution of a million continuous horsepower, that may be developed on the interior streams of the State.

The vast potential energy of the water powers of other States

are referred to in various reports, some of which are cited in this report and in Appendix "A" thereof.

All such water powers within the United States may be developed by the States themselves, as New York is to do under its water power laws and without involving itself in any national or international complications. Such water powers of the several States, aggregating 60,713,200 horsepower without storage, may be developed and distributed cheaply in close proximity to the industrial centers, where needed and far more economically than can the water powers of the St. Lawrence be developed and the electric energy therefrom transmitted, which is exceedingly problematical, to remote industrial centers.

APPENDIX H

ADDRESS OF HONORABLE NATHAN L. MILLER

Governor of the State of New York

In Opposition to the Proposed Canalization of the St. Lawrence River.—Delivered Before the National Rivers and Harbors Congress, Washington, D. C., March 1, 1922

Mr. President, Governor Allen, Mr. Merrick, ladies and gentlemen: I want to assure you at the outset that I am not here because either New York or I wanted to talk more upon this project. I came here reluctantly, because I knew that my presence would be used to support the assertion which you have heard from both of the distinguished gentlemen who have spoken upon the other side, that New York is the opposition to this project. It is a great national undertaking and I have come here to discuss it, not from the standpoint of the State of New York nor as a citizen of the State of New York but as a citizen of the United States and I intend to confine what remarks I make solely to the proposition as to whether it has been established that this project is in the interest of the United States. Governor Allen wants to know whether we are opposed to this because we think it will not work or because we fear it will. Now I do not wish him to remain longer in doubt as to the attitude of the State from which I come although I am not here to speak for that State. If there is any reasonable assurance that this tragedy which the Governor says has been resting upon the middle west can be removed, if there is any reasonable assurance that the Atlantic ocean can be extended two thousand miles into the interior of this country then the State of New York will heartily support this project.

I labor under a considerable handicap because while I expected, when I accepted the invitation, only to have to go up against Governor Allen, I find that I am up against two of the

distinguished and able exponents of this project but I am laboring under a further handicap and that is that their side of the question greatly appeals to the imagination and I have discovered that the imaginations of Brother Allen and of Mr. Merrick are equal to the situation.

There are two reasons why the Middle West has become so insistent for this project that she uses the term "sectional." I want to say now that there is no sectional feeling in the State of New York on this subject. I am not even going to approach that short and ugly word which Brother Merrick hinted at though he did not utter. There are two explanations why the Middle West has so aroused public opinion there to become insistent for this project and so insistent that they do not brook any opposition whatever. One of them is the tragedy the Governor has referred to. We sympathize with the Middle West and if there is any way to cure that tragedy — and I am going to suggest one before I am done — and it won't be the barge canal either — then we are in favor of curing it. Those of us who read what happened during the years succeeding the war when the grain growers of the West saw their grain waiting, when there was a market ready to take it at good prices, and had to lose that market because they could not get transportation, can understand why the people of the West feel as they do.

Now there is one other reason which explains it and that is this tremendous appeal to the imagination which this project of extending the Atlantic ocean 2,000 miles inland makes. Somebody was kind enough to send me just before coming here this clipping from the St. Louis Post Dispatch of January 29. There you see painted what will happen when this new Mediterranean is created. It is headed, "Bring the Atlantic Ocean into the Middle West." It says in the headlines, "Liners would ply between Chicago and Liverpool" and it says, "This is the kind of news items that the people of the Middle West will be able to read. The Mauretania from Liverpool docked at Chicago yesterday." "Among those on board were (blank) or the Leviathan sailed yesterday for Hamburg. She will touch at Cleveland and Detroit for passengers. The freighters Lancaster and York sailed from Duluth yesterday with full cargoes of grain for Bremen."

Those two things, the tragedy, coupled with this appeal to the

imagination accounts for the feeling in the Middle West which causes this word "Sectionalism" to be used. Reference has been made to the President's message of yesterday to Congress. That is the kind of a "broadened vision" which he said had caused the demonstration of the Middle West in favor of this project. A vision of something which you know is impossible. Now I believe in visions. Great things are accomplished by men of visions. We have been suffering, however, for some time in this country from the policies of men who thought they were men of vision. But who in fact, were visionary. Now I wish to discuss this subject not from the imaginative standpoint, not to paint pictures or to see visions but to consider the cold hard facts. Our friends say that that is the matter to be considered — the facts. And then they start out with the assumption which they say has been demonstrated by the reports of the engineers and by the report of the International Joint Commission, that this project will do what they claim for it and then upon that assumption they paint these pictures which Governor Allen has been painting. Now on that assumption, Governor Allen, I agree with you. If your assumption is correct, then we are with you and New York will join with you regardless of whether she pays 30% of the taxes or not. And I do not think it makes any difference how much taxes New York pays. If they are equally distributed I agree with Governor Allen that if the rate is 30% then it is her good fortune. I hope that we are not so provincial in New York that we cannot understand that anything that will serve the great Middle West and help to develop its great interests will also serve the State of New York. And I want it distinctly understood that the State of New York is not afraid of what may happen to the Port of New York nor is it afraid of competition with the barge canal. We have constructed the barge canal for you at enormous expense. It is there. You can use it or not as you see fit. If you do use it, it will not cost you anything because New York maintains it at its own expense.

Now, let us get down to facts. And what is the first fact? How is this proposition to be financed? They dress it up in alluring colors. They say that this gigantic project can be undertaken even without involving the slightest expense to the Federal treasury and so it will not interfere with the develop-

ment of the Mississippi and its tributaries or it will not interfere with the expenditure of money on other river and harbor improvements. Now I say at the outset that the question of financing this project in the manner suggested has not been considered in any way that entitles the name consideration to be given to it. They say the water power will take care of it and I was glad to hear the admission from Governor Allen that the State of New York owns that water power, so far as it is within the State of New York. Well, that is the law. It is settled by the decision of the Court of Appeals of New York as well as of the Supreme Court of the United States, in the so-called Long Sault case that the State of New York owns in trust for its people the bed of the St. Lawrence river on the American side, and that carries with it under the law of riparian rights which prevails in the east, that carries with it the right to the use of the water and the development of the water for power purposes. They say that they propose to take that water power not merely to finance the part of the project that has to do with the development of power but to finance the entire project. Well now let us consider that for just a moment.

I grant that the right of New York is subordinate to the power of Congress to improve navigation. I grant that if Congress in the improvement of navigation develops water power as a mere incident, Congress may say how that water power shall be disposed of, even though it thus does take rights belonging to a State. But when you make the water power not the incident but so far the main project as to saddle it with the entire burden of cost, then you can no longer say that the power is a mere incident. Now I shall not discuss the legal question as to the legal right to do that thing. I want, however, to discuss the moral question. The assertion has been made — I do not think it was made here to-day, but it is one of the stock arguments — that the opening of this ship canal will add ten cents a bushel or at least five cents, to be safe, to every bushel of grain produced in this country and they compute that that will mean \$350,000,000 to the people of the Middle West. That is a vision. But assuming it to be sound, I want to ask Governor Allen if he thinks that it is a fair thing to make the power users of New York and New England pay the entire cost, assuming that that is feasible, of both the power project and the naviga-

tion project? Now I admit that power ought to bear the cost of the power part of it, but I say that at least one of two courses should be followed with reference to the expense for navigation. Either that should be collected from tolls, and I do not believe in tolls. The State of New York does not exact any tolls for passage through its barge canal and I hope the time will come and come as speedily as possible when we will not exact any tolls for passage through the Panama Canal. But I say that one of two propositions is fair — either this \$350,000,000 a year that Brother Allen is persuaded will be saved for his people, should bear the cost of the navigation project or else it should be paid out of the Federal treasury. Now there is another thing they have not thought of when they proposed to saddle the entire cost on water power and that is that this power would be distributed as Governor Allen has suggested under the jurisdiction of the Utilities Commissions of the states in which they are distributed. That is the provision now in the Federal water power act and I do not suppose that Congress could be induced to take the water power of State out of the control of its water power commission, but I am quite certain that the Public Service Commission of the State of New York and of the New England states would insist that the capital charge to be assigned to water power should be limited to the capital cost attributable to development of power. Now where does that leave you? That leaves you on the report of the engineers, and I am now coming to that, roughly, on the basis of a twenty-five-foot canal, the cost would be apportioned probably in about the ratio of \$150,000,000 to water power and \$100,000,000 to navigation. If you deepen it to thirty feet on the report of the engineers, that cost to be charged to navigation would go up something like eighteen million or twenty millions of dollars. Now, so much for that. I say they have not even studied that side of the question — they say “commit the Government to this project.” A resolution is now in Congress providing for the issuance of bonds to be guaranteed by the two nations. They do not say how the bonds are to be financed. They do not say how the interest is to be provided for or how they are to be amortized, but our friends say, without having considered the difficulties, in their way, “Oh, it will be paid from the water power,” and so they say “We are not committing the treasury of the United States to anything, and, therefore, those who

fear their other local improvements may be jeopardized, may lay their fears aside."

Now, what is the next proposition? Governor Allen says that the report of the engineers is that this project is feasible. The engineers have not reported on that subject at all. They were not required to report upon that subject at all. They say in their report that they have not considered that subject. They were required to report upon the engineering aspects of it. They say that this canal can be constructed and nobody doubts but that it can be constructed. They say that for \$250,000,000, or \$252,000,000, a twenty-five-foot channel can be provided and a 1,400,000 horse power — I am using, of course, round figures — can be developed. That is what they say and all they say. Now I assert first that the report of the engineers upon its face shows that it is superficial. The report of this International Joint Commission that we have heard so much about, shows that it is superficial. The report of other engineers who have studied the project, which was submitted to the International Joint Commission, assert that it was superficial. Now, what is my justification for that statement? I refer now to page 167 of the Report of the International Commission, and what do they say? They say that the instructions to the engineering board make it clear that they are not expected to submit anything more than the outline, more than outline plans and lump sum estimates, the period of twelve months allowed them for the work being considered insufficient for the preparation of detailed plans and estimates. While it was obviously impossible to deal exhaustively with such a very large and complicated engineering problem in twelve months, the engineering board has unquestionably, both in the matter of plans and estimates, given the commission more detailed information than the strict letter of the instructions called for, and has put it in a form that leaves very little to be desired. They then recommend this: They recommend that this report be referred back to another board with enlarged membership of other distinguished and impartial men in the engineering profession, in order to determine what the real facts are. They say that that should be done after the plan has been adopted. I say that it should be done before the plan is adopted.

We have heard from Mr. Merrick how the directors of a corpora-

tion manage its affairs. I am sure that he does not allow any corporation of which he is a director or officer, to act upon a project so important and without having the complete investigation before instead of afterward. But that is not all. These estimates of \$250,000,000 I am not charging bad faith. I am not going even to hint at that short and ugly word, but I say that at least they should invite careful scrutiny when a systematic and persistent attempt is made to belittle those things that are serious against the project and to magnify those things that are thought to make in its favor. My figures have not grown any, Governor Allen.

I do not know how much this would cost. The figures that I used at Buffalo to which he has referred, were figures of a distinguished hydraulic engineer, Hugh L. Cooper, and the people of the Mississippi Valley know something about his engineering ability because one of his monumental engineering works is there.

Now, in the first place, it appears upon the face of this very report of the engineers that they have made no allowance whatever for interest during the period of construction, or until the time arrives that the proposition will be self-supporting. Think of an engineer omitting such an item! Ten years is the period that the International Joint Commission says will be required. We thought we would construct the Barge Canal in ten years and it took twenty. But in ten years, interest charges mount up, and when the ten years are past and the thing is complete, it is not going to pay at once. It is going to take some years before you get the line of which the Mauretania is a part, to change her sailing to go to Chicago. Water power! There is no market or practically no market whatever at the place where this power will be developed; and there are many engineering features yet to be studied before it is determined where that market is going to be and how much it is going to cost to get the electricity to that market. At any rate, it is going to take years. How many, I do not know — during which interest charges are going to pile up. But they give it out over the country that this thing can be done for \$250,000,000, a mere bagatelle, less than they will save in one year on wheat. And then they want to commit the Government and the Federal Treasury to it upon the assumption that in some way not disclosed, not even studied, that water power is going to pay for it. Now I say that an engi-

neering report which omits to make any account of an item of cost, of such large proportions, is impeached upon its face, but that is not all. They made no borings, in order to determine the character of the rock on which these immense works are to be constructed. Do you know anything about the St. Lawrence? About the swiftness of its currents? The depth of its waters? The icy conditions which exist there in the winter under more difficult conditions to cope with than probably in any other similar stretch of water where power can be developed on the face of the earth? Works to withstand that enormous pressure that will be needed. Works to withstand the effects of accumulations of ice, have been planned without a single boring to determine the character of the rock upon which they are to rest. And they say it has been established that this thing can be done for two hundred fifty millions of dollars. They made surface observations and attention has been called to that fact by the report—by the comments of the same engineer to whom I have referred, Hugh L. Cooper, which was filed with the International Joint Commission. But that is not all. Mr. Cooper says in addition that if the works are constructed in the way these engineers have planned, that they will automatically close down every winter from the effects of ice. No engineers are controverting this subject and that is not all. They propose to develop a million four hundred thousand horse power. He says that if the dam, the first dam, the only one that is now to be constructed, to develop power, the dam in the fourth section, if that is placed where it ought to be placed and is constructed as it ought to be constructed, that it will develop not simply a million four hundred thousand horse power but additional horse power of 240,000 computed on a load factor of seventy. That other 240 net or 300 gross might help a little to solve this financial problem that they have got, in case they are going to be unfair enough to ask the water power users of New York if they exist in sufficient quantity, the electric power users to use this, ask them to bear the entire burden. I say and I now speak for the people of the State of New York because there I have a duty to perform. We are interested in the development of hydroelectric energy. We are not afraid as Governor Allen says and we are not intending to let it go to waste for fear of graft. We intend to have it developed and of course it must be developed in

co-operation with the Federal Government and with Canada, because an international boundary stream is involved. But we say that 240,000 or 300,000 gross horse power belonging to us ought not to be sacrificed for a navigation project, at least unless it is first proven that it is necessary to make that sacrifice and unless it is next proven that that navigation project is feasible.

But I must hasten because I see my time is flying. And I must pass on from these engineering matters. I submit that I have said enough already to show that upon the engineering features the surface has not been scratched. There are two great projects here. One a water power. One a navigation project. Neither, if both are feasible, should be sacrificed for the other. Both should be developed to the very maximum of efficiency and each so far as may be should contribute to the other, but I say that before we commit ourselves to that project let us first have what these gentlemen are asking for — facts. Now so much for that. They have not even considered in a scientific way how they are going to market this power that is going to finance this project. There have been no surveys made to determine where the lines were to be constructed or how, and they would have to go around our forest preserve until at least we can amend our State constitution and I am trying to have it amended, Governor Allen, not only to help transmission from the St. Lawrence, but transmission of power from other places — our constitution prohibits the construction of a transmission line through our Adirondack preserve, and it would be necessary to build transmission lines around that preserve. Nobody has figured at all so far as the proof discloses what it would cost to build those great high tension, at least 250,000 voltage, wires to their market. Nobody has yet said where their market would be. They have done this. They have taken the use of power. They have said New England uses so much power, steam and hydro-electric; New York so much; and they have taken it for granted that there won't be any trouble in marketing this particular power. They refer also in their report to the report of the Super Power Zone Commission. I don't know whether you know what that is or not. I have not time to discuss it. It is simply a general survey. It is a project that appeals powerfully to the imagination, and I hope some day may be realized.

That day is long in the future, if it should be realized. And it involves electrification of these broken-down railroads that have not got enough money to buy the box cars that Brother Merrick says they need. It involves the scrapping of all the steam plants and the building of new steam plants in the most economical location with reference to the mines. It involves the utilization of hydro-electric power and it contemplates finally all power that is produced in that zone both steam and hydro-electric will so to speak, go into one common reservoir, so that by the turning of a button you can send it here, there, anywhere within that great zone and thus secure the utilization of the maximum amount of power with the least loss, and on that computation they make their figures on an 80 per cent load factor. But to-day the maximum load factor that any hydro-electric concern would figure on would be 50 per cent; and in New England, where they say they are going to send this power, they could not count on more than thirty-five, but at fifty this power that is going to be used to finance this project is at once cut from a million four hundred thousand to 700,000 usable power or only three hundred fifty thousand in the United States.

Now before they launch the credit of the government in support of this project on the theory that water power is going to pay for it, I say it is necessary to have some further study. So much for that.

But that is not all. They have only scratched the surface of the cost of this thing and I am not going to impugn their motives. Governor Allen says he is bound for Liverpool. Well, you have a very uncertain voyage, Governor, if you undertake to sail on any bark that will navigate the Great Lakes with their limiting channels of twenty feet, as now exist. They say it is unnecessary to consider the cost of deepening those channels and harbors. The International Joint Commission recommends that the cost of the Welland Canal improvement shall be borne by the two governments. There has not much been said about that. Canada thought it was going to cost fifty million dollars. It is probably going to cost at least seventy-five and because, I take it, of her financial condition the work on the Welland Canal is almost suspended. Her project calls for twenty-five feet. In order to deepen it to

thirty feet — and I say that is the minimum that any man in his senses would think of if he is going to give Governor Allen the voyage that he has been longing for so long — nobody has estimated how much it will cost to extend that five feet more but what else? I said the limiting channels in the Great Lakes is twenty feet. They vary. Twenty, twenty-one, twenty-two. Now for some reason they have tried to keep away from that. They have said you have not got to consider that. This International Joint Commission, which is said to have said the last word, says it is not necessary now to consider it. They say that probably those channels will be deepened anyway, sometime would have to be. Every board of engineers — now I don't want to make a statement that is not true — I think every board of engineers and many have been requested by Congress to report on the cost of deepening those channels — every board at least whose report has come to my notice up to date, has said that the great cost of deepening those channels was way out of proportion to any benefit that could be derived and when a fourteen thousand lake freighter with its flat bottom, without the necessity of providing space for coal, which an ocean liner has to provide, when a fourteen thousand lake freighter can navigate those channels it is quite obvious that there is no pressing need of having them deepened for the lake business. But the other side in their desperation have undertaken to prove that it is not necessary to deepen those channels. They want to take Governor Allen to Liverpool and they say they can do it on ships that will sail a twenty-foot channel. And this is the way they say or this is the way they figure: they have taken the tonnage, the ships, as shown by Lloyd's Register. They talk about this, this great International Joint Commission say that they are tremendously impressed by this fact. They say that a certain percentage, I think 70, of the ships built during 1918 and 1919 had a draft of less than twenty-five foot and a certain other percentage less than thirty, and they figure that a twenty-foot channel will be enough. Well, I happen to have the report of Lloyd's register of shipping and the note right on the first page says that those figures take into account only merchant vessels of one hundred tons gross and upwards. Every barge and scow that has been built capable of carrying one hundred tons is taken into account and so they get this average of 70 per cent

being under twenty-five foot draft. Now I am sure that Governor Allen does not want to take that voyage to Liverpool in a scow.

They say that a census shows that a large proportion of the shipping that went through the Panama Canal could be accommodated not on a twenty-foot draft but on a twenty-five-foot draft. That shipping is not analyzed. It is not shown what the character of those ships was or for what trade they were intended and the fact is unless I forget it, I want to mention it now, as showing the utter worthlessness of this report of the International Joint Commission. What did they do? They went over the country hearing the exaggerated statement of the proponents of this scheme on the one hand and the opponents of it on the other, and I am willing to concede that the opponents went fifty-fifty with the proponents in the matter of exaggeration. Then without any independent investigation of their own, because they said in their report that they employed statistical experts to check up figures, these are problems to be dealt with, not by statisticians, who know nothing but distances and averages, but by experts in their several fields, and there are many fields that I want to come to before I get through.

I see I have got to hurry. I knew when I offered to let Governor Allen go on that I could not cover this subject in an hour. But as usual he was too smart for me. Now, this that I am talking about is a fair indication of the character of evidence that moved this International Commission. This evidence of averages taken from Lloyd's Register. This evidence of averages from ships passing through a given point. They did not have to take averages. They had some evidence right before them which would have told them the kind of freight steamers that would use it. Even tramps. I am astonished that with the vivid imaginations of the Middle West that have been aroused by the dream of the Mauretania and the Leviathan and those great ocean liners that Brother Merriek is willing to get his project down to tramps. He says it is going to accommodate the tramp steamers, of which there are many. Yes, but the figures will show that the tramps prior to the war were gradually disappearing from the seas. We are engaged in a project that will take ten years to complete. The forces, the economic forces, that were operating to drive the tramp from the seas will again be brought into force and if not

ten years from now, my vision at least — and I hope that I can be credited with having some vision as well as my friends on the other side — sees the time when regular lines of steamships and not tramps will be required, and let me tell them, too, that this great expenditure will never be justified if only tramps enter the lakes. Their sailings are too uncertain. They can only accommodate a certain class of merchandise, and Governor Allen says that they are looking for an outlet to the sea for two hundred millions of tons. That shows something about his imagination.

When I call to your attention the fact that the total export and import tonnage of the United States in the year 1920, a banner year, was only fifty-four million tons. And I suppose that Brother Allen will be willing to admit that even after this Mediterranean has been created that the Pacific, the Gulf and the Atlantic ports will carry some of that tonnage. On this question the Commission had before them the evidence of the character of vessels that would navigate these lakes if any. Where would you go? Would you go to Panama or would you go to Montreal? If they are going to extend the sailings of the ships up into the lakes the first ships whose sailings will be extended will be those which now go to Montreal won't they? Now, when the Commission sat in Montreal they received testimony of the draft of the vessels that had loaded and departed from that port the month before and I want to give it to you; the Banton twenty-three feet nine inches. Now that vessel could creep along through a channel of twenty-five foot, and this reminds me of another inconsistency of our friends. In order to put the camouflage upon this enterprise that it was not going to cost anything they have gone to great efforts to prove that the present lake channels are ample. Twenty feet. But when it comes to computing the cost of transportation they testify, all of them, that these ocean freighters will go sailing through these restricted channels with practically undiminished speed. The report of the International Commission shows that they found that these ocean freighters would go through these restricted channels without any appreciable lessening of a speed from eight to ten miles an hour, and yet in every canal that is known, the Panama, the Suez, the Kiel, these great canals, the speed is

limited. They are not permitted to go more than six miles an hour and in many of them not over four. But while in one breath they say the restricted channels are going to mean no harm in the next they say they can get along with the present twenty foot channels in the lakes. Now to resume. The Banton could get along but crawling, creeping probably, with a foot of water under her keel. She ought to have four feet. You know, anybody who knows anything on the subject of the great suction of these vessels, how clumsily they yield to their rudders in such waters. Their tendency to sheer and the like. And they require ample water under them, but that vessel with twenty-three feet nine inches could creep along on twenty-five feet. She could not get in through a twenty foot channel now. The Malita, twenty-seven feet six inches. I must hurry. Without mentioning the names I am just going to give the drafts: Twenty feet; twenty-five feet seven inches; not twenty, none of them twenty; twenty-three feet three inches; twenty-four feet four inches; twenty-six feet; twenty-five feet two inches; twenty-six feet three inches; those are the drafts. Would anybody dream of providing a channel for these ships and this canal wouldn't be completed in ten years but for these ships under thirty feet. I say that the very fact that these people are trying to rush this proposition through upon the assertion that it only involves two hundred and fifty millions of dollars upon the superficial examination that they have made, upon the assertion that it is not necessary to consider the deepening of the channels of the Great Lakes, that fact indicts their good faith. It shows that they are not willing to have the facts examined. It shows that they are trying to commit this government to something that neither they nor anybody else has computed. Now then I assert that a thirty foot channel is the very minimum that anybody would suggest. What does that mean? It means deepening the lake channels and harbors to thirty feet. Why didn't they make a study of that? I made a statement that that subject had not been investigated and Governor Allen caught me up in a speech that he made afterwards and called my attention to the fact that Army Engineers, I think, in 1905, did make an estimate. They did. In 1905 or 1906 they made an estimate that it would cost \$25,000,-

000 to deepen the channels of the Great Lakes to twenty-five feet. They didn't say how much it would cost to deepen the harbors correspondingly and the approaches to the harbors. They said that it would cost millions more, but that the project was so indefensible—that is not their words—that they did not make the estimates. How much would it cost to deepen these channels and harbors to thirty feet? I do not know. Governor Allen does not know. Nobody knows because it has not been investigated, but if it would have cost \$25,000,000 in 1905 to get twenty-five feet it would undoubtedly, as a guess cost a hundred millions more to get the thirty feet. But that is not all. If Governor Allen is to have his dream realized you have got to do something else besides deepen the channels. Your terminals are provided for the particular class of business that they handle. Your terminal—your freight handling machinery is provided for that particular kind of tonnage, coal and ore and what packet business there is has been built up along little rivers in your harbors which would be wholly inadequate for ocean commerce. If the Governor's dream is to be realized you have got to build at your lake harbors great outer works, great breakers, great amount of dredging. How much it would cost nobody knows. Breakwaters, I mean—not breakers. But you have got to construct these great outer harbors to provide for ocean shipping. The President tells me that I have only five minutes more now. The most important part of this is lost.

I want to go to another subject. I have said enough here to indicate, gentlemen, the vast expenditure that is involved, and after you have deepened your harbors, after you have used for dock purposes lands in Chicago, for example, which Mr. Merrick knows how valuable the water front property now used for other business purposes has become, still these vessels would be of no use unless you have completely reconstructed your railroad terminals and you propose to make these railroads, that now can't provide you your box cars, spend millions. Undoubtedly it would take one hundred millions in the city of Chicago at least to rearrange the railroad terminals to coordinate with water shipping. Now I say, before we go on with that project, let us find how much it will cost and let us find whether the people who

have got to bear that cost are willing to do it. I was going to tell Governor Allen where his own State could get an outlet to the sea. He now has a rail-haul to Chicago which I think costs twenty-five cents or more a bushel, doesn't it? By improving the Mississippi and the Missouri rivers, he can get right at Kansas City a water-haul, first by barge to New Orleans and then by ship to Liverpool. Water all the way. And cut out his rail-haul to Chicago. I wanted to discuss that subject and to point out to him the relief for the wheat growers of the West. He imagines four hundred millions of people here. Well, if that imagination is justified, we will certainly be importing and not exporting wheat. It may be we will be exporting from these prairies of Western Canada, but I am sectional enough to believe that we ought to take care of our own products before we undertake to take care of those of our neighbor's. There is Brother Allen's solution and I wanted to develop it further, but there is one other important subject that I must bring to your attention, and that is this: it has not even been suggested. It has not been studied. The International Joint Commission was required to study it. They were required to say what traffic, both incoming and outgoing in kind and quantity, is likely to be carried upon the proposed route and so forth. For time I cut short the question. Their answer is: "To this question also it is impossible to give a specific answer." And they say further that the Commission has so much confidence in the virility and the resourcefulness of the people of these two countries that it is convinced that the traffic available for the new waterway will rapidly increase. Well, now, apropos of that, I say we want something besides vision. We want facts. This commission did not even consider the most important and the most vital fact in this whole controversy, and that is this: I was going to discuss that subject, but to save time I am going to assume for the moment that these ocean ships that they are talking about will sail up into the Great Lakes; physically they could do it. I am going to assume that transportation costs will be such that they can do it. That is a matter that has not been proven and I would like to talk about it, but I can't. But I say, assuming all of that, the question still remains whether they would do it, and this is the question that requires the most expert opinion which has not yet even been consulted.

It is not transportation costs that determine the routes of trade. That in fact is a minor factor. I read a speech of Congressman Nelson in Congress the other day in which he said that freight which should logically be shipped from Portland, Boston, Norfolk, Wilmington, Charleston, Savannah, Jacksonville, Tampa and Mobile directly to foreign destinations now proceeds by rail to New York at great cost because it cannot obtain a ship to destination from the port which should receive the traffic. Why is it that the port of New York carries such a large percentage of the foreign trade? And we are going to spend five hundred millions and more, if it is necessary, to make that port serve the commerce of the country. One of the last things I did before coming here was to sign a bill which puts an end to disputes and the jealousies that have prevented the proper development of that port. I admit that it has been a sin that for so many years the terminal expenses in New York have been so great. We are going to put a stop to it, and we are going to begin not ten years from now, but we have already begun. And we are going to do it. Not to divert shipping from other ports. We want shipping to go where it naturally should go. We want the gulf ports to have the shipping that is rightfully theirs and the export wheat of the future, of the region that the Governor comes from, should economically go to the gulf ports, and it should go there by water and the water facilities should be improved. Mr. Nelson thought that the reason why exports continued through New York was because the railroads went there. The fact is — is my time up? I must discuss this. I will have to take part of my seven minutes.

ADDRESS OF REPLY TO REBUTTAL

Discussions of this kind are useful. Men with open minds who get together and talk about a project are likely to come close together, and Governor Allen and I are very close together at this moment, if I correctly understood what he had to say. Now in the first place, he has entirely misjudged — while I say we are nearly together, he has entirely misjudged the point of my argument. I agree with him that Queen Isabella did a splendid thing when she pawned her jewels, but we are not living in the days of Queen Isabella. Most people in those days believed that the

world was flat. We know now that it is round. We know the great forces that control the channels of trade. We know the great engineering facts and factors and all I have undertaken to assert here this afternoon was, not that we should not embark on this project but that we should first find out all of the relevant facts before we decide what to do.

I am glad to have got an admission from Governor Allen that it will cost possibly twice as much. That is not the point. I agree with him that if it will do what he thinks it will do, it does not matter what the cost will be. What I have contended for is that we should first find out all of the elements of the cost. Find out how it is to be financed; whether the method proposed is practical; whether the results to be accomplished will be feasible, and when those factors are determined we can decide whether to go ahead or not. Now I wanted to mention one other subject of investigation which has been entirely overlooked, and which is probably the controlling factor on the question of feasibility. I said, just before I sat down, that transportation costs and distances do not determine routes of trade. I had read Congressman Nelson's complaint that commerce still went through the Port of New York although, as you know, there is a differential, a railroad rate differential, in favor of the other Atlantic ports. Congressman Nelson thought freight went to New York because the railroads went there. But you know that the railroads go to the other ports as well. That is not the reason. Now let me tell you very briefly what this problem is, and it has never been considered by these gentlemen.

There are only four great centers of distribution. New York, London, Liverpool and Hamburg. How does it happen that there are only four? Because of transportation cost? No. It is because the great machinery of commerce, the great trade agencies, have their centers in those four places from which they radiate to all of the other ports of the world. This 200,000,000 tons that Governor Allen talked about is made up not of bulk freight. It is made up of package freight, that is assembled from various places. And do you know that freight merchandise will go thousands of miles out of its way in order to reach a center of distribution like Hamburg or London or Liverpool or New York,

and from there will be assorted and redistributed and sent again over the arteries of trade that center there? It takes years. It takes money, and immense sums of money to build up the trade organizations which control routes of commerce. The fact is that merchandise at this very day is shipped from Venezuela to New York City and then redistributed and shipped by rail right to the gulf ports when they would have a water route directly from Venezuela to these ports.

Governor Allen complains because somebody has said that there was a channel of a thousand miles. I suppose that somebody was talking about the route for the entire distance either to Duluth or to Chicago from Montreal, but is he quite fair when he says that the narrow channels would be only thirty-five miles? Thirty-five or fifty miles? What was it? I have not computed all the channels, but the channels between Lake Erie and Lake Huron and Lake Superior and the channels of the St. Lawrence would run into hundreds of miles and not thirty-five miles. No doubt the Governor made that statement without intending to, but that is a bagatelle. The question is: assuming all of those other things is there any reason to suppose that the machinery of business will be centered in those lake ports which have not yet been centered in other ocean ports? That is a matter for expert opinion of men who understand this problem. I do not pretend to understand it.

Why is it that New York retains her shipping against a great differential in favor of these other Atlantic ports, Baltimore and Philadelphia, Boston and the others? Why, against her excessive terminal costs, so bitterly complained of? It is because these centers of trade that I speak of have been built up there. Is there any reason to believe that the gulf ports would be able to establish — I mean the lake ports — would be able to establish such centers of trade if the Atlantic ports now are unable to do so? But that is not all. Assuming for the moment — and I have had to assume that in the matter of transportation costs, these ocean steamers would enter the Great Lakes; assume that we have spent on Governor Allen's admission, not two hundred and fifty but five hundred millions on this project; assume in addition that the lake cities had spent anywhere from one to two hundred

millions apiece to improve their terminals; assume that the railroads could be induced to spend the millions necessary to co-ordinate the terminal rail facilities with the water facilities; assuming all that, what reason is there to suppose that the lake ports — and there are some narrow channels — would do what ocean ports have been unable to do?

I say that must be made the subject of expert study, but one word more. What would it mean to extend these facilities, the physical as well as the commercial, to the lake ports? It would mean that the business houses who did it would have to maintain two such agencies because you would be in ports that would at least be cut off from the ocean five months of the year. I do not from the fact that the barge canal is frozen over, five months in the year, offer the barge canal as a substitute to the St. Lawrence route. I am not offering it as a substitute. It is not a substitute. It can only handle economically bulk commodities like grain, but you are proposing to divert ocean shipping to ports which have been closed by ice five months in the year. Is there any certainty that you can establish these great centers of business in order to justify that? What does it mean. They say that the railroads are now crippled. Wouldn't they have to rely upon the railroads the other five months in the year? You can relieve the railroads of seasonal business by water transportation, by the improvement of our inland rivers, by shipping over the barge canal, if you care to do it; you can relieve the railroads of that peak business, but this two hundred million of tons that the Governor talks about must move twelve months in the year and while complaining on the one hand that the railroads upon whom they must rely for five months are now so crippled that they cannot render service, they propose a project that would still further cripple the railroads upon which they must in the last analysis rely for at least five months in the year.

Now may I just state my point of agreement with the Governor? The Governor says this is all preliminary. If it is, well and good. I think Brother Craig will get after you, because he says that there must be action this winter by Congress. Now I agree with the Governor that we have now got through with the preliminary stage. We have got down to the point where we at

least know what the factors are that are to be studied. That is as far as we have got. I agree with him and I ask you to take note of his admission. He says the next step is to have Congress provide for expert investigation of these subjects.

GOVERNOR ALLEN: No, no, no; of the methods of building.

GOVERNOR MILLER: Ah! I was afraid there was a joker in that. I knew he would want to hedge when I reminded him of Craig. No, no. He evidently still sticks to it. "We must commit ourselves to that project now and investigate afterwards." I say investigate first, and if proven feasible I am willing to pledge the support of anybody whom I have a right to speak for.

Let Congress provide for a new expert investigation of this subject, not in a preliminary way, but in a final way, to determine these various factors. Let experts, impartial experts — not the kind that your Tidewater-Great Lakes Association called before the committee. Not the kind who know nothing but distances and averages — let them employ impartial experts who understand these factors. Engineering experts who understand engineering factors. Navigation experts who understand the navigation problem. Water power experts who understand the water power problem. These great experts — these great agencies — commercial agencies — which control the centers and routes of trades dispositions. Employ men who understand these subjects.

GOVERNOR ALLEN: Governor Miller, since you are using a little more than your allotment of time, will you let me ask you a question?

GOVERNOR MILLER: Certainly.

GOVERNOR ALLEN: Is it your contention that this international commission called before it none of that character of testimony?

GOVERNOR MILLER: None. I am willing to state and I must admit that I have not read all the testimony. It is a stack, at least that high (indicating about seven feet).

GOVERNOR ALLEN: Isn't it possible, some of it may have been, from intelligent sources, in a stack that high?

GOVERNOR MILLER: I don't say it is not from intelligent sources. I say, Governor, the evidence that was produced on both sides was the evidence of men who were committed or opposed to the project in advance. It was the testimony of men — it was the men produced by the various chambers of commerce and the various organizations like your Great Lakes Tidewater Association, evidence of men committed or opposed to the project, and I say that that character of evidence is not the kind of evidence upon which to base a conclusion. And what I am willing to stand for is that Congress shall provide for an investigation of this character. Appropriate a million dollars. I don't think that is enough. Appropriate two millions of dollars, if you will. The resolution before Congress is for a million. Appropriate any sum, whatever, that is necessary to have the most thorough investigation made by impartial experts. I don't want to select them. I say that Brother Craig should not select them. Let them be selected by official sources. And after all of the facts have been developed, if these facts indicate that this project is feasible, I pledge my support to it, no matter what it costs. (Prolonged applause.)

APPENDIX I

Decrease in Exports of Grains and Other Cereal Products from the United States

(Statement prepared from official reports by experts in the grain and
milling business)

The surplus of wheat and other grains for export from the United States, except for the abnormal stimulation of the war, has been steadily decreasing for some time past and everything points to further decline as the population of the country increases. The report of the United States Tariff Commission, entitled "Agricultural Staples and the Tariff," published in Washington in December, 1920, contains a mass of very accurate information on this subject. On page 13 of the Summary and Conclusion of this Report it is stated:

"The great increase in the American production (of wheat) during the thirty years preceding the World War, had been primarily due to the new lands that were brought under cultivation. It coincided with a diminishing proportion of arable lands sown to wheat, even in the grain belt. In the older regions wheat had lost ground because of the competition of other crops and of more productive and cheaper land available elsewhere. From such unoccupied areas as may hereafter be cultivated no large contribution is to be anticipated. Moreover, the increase in production has not kept pace with the growth of population and consumption. Most of the States now consume more wheat than they produce. In the years immediately preceding the World War, American exports of wheat, in the grain, had come to consist largely of the exports of the Pacific Northwest, which ordinarily can ship more cheaply to the Orient and to Europe than to the distant American consuming markets, and of durum wheat, for which there was then only a small domestic demand."

And on page 14:

"Since 1914, however, the United States has been the dominating factor in the world's wheat and flour trade. For an indefinite period the World War has eliminated the surplus of Russia, formerly the largest exporter, and of Roumania. The shipping situation also placed a premium upon North American supplies, and the farmer was guaranteed a minimum price over twice as high as the pre-war level. In consequence, wheat cultivation has

been maintained and increased in the American regions producing at higher costs. But it is significant that in the crop year 1919-20 a reduction of 20,000,000 acres occurred in the area sown to wheat."

In support of the above statements, please note the following figures, which are also official:

WHEAT		Average yearly exports
Average yearly production		(wheat and flour)
1880 to 1899, inclusive, 20 years,	475,000,000 bus.	149,830,000 bus. or 31 per cent
1900 to 1914, inclusive, 15 years,	678,000,000 bus.	146,495,000 bus. or 21 per cent
1915 to 1921, inclusive, 7 years,	812,000,000 bus.	242,030,000 bus. or 29 per cent

The significance of the above figures lies in the fact that in the period of fifteen years prior to the beginning of the World War, production in the United States, while larger than at any previous time, still did not keep pace with the increase in population, so that the exportable surplus was actually slightly less in average amount than during the previous period and was much less in percentage. Then since 1915, due to war conditions, fixed prices and the fact that Russia has failed to export, there has been a big increase in production, with some increase in our exports.

Increase in diversified farming and exhaustion of land in the United States will inevitably tend to further decreases as conditions approach normalcy in Europe. Canada has become, and will increasingly continue to be, the principal factor in the exportation of wheat from North America.

But what about the other principal grain crops — for example, corn and oats? In the first place it may be stated that less than 25 per cent of either of these crops ever moves from the county in which it is raised, and therefore only a small proportion becomes a factor in commerce or transportation. As regards export, the proportion sent abroad is so small as to be almost negligible, although corn figures for 1921 show an increase, due to abnormal conditions abroad.

CORN CROPS AND EXPORTS (INCLUDING MEAL)

Crop year	Total crop	Exports	Percentage of crop exported
1913.	2,446,988,000 bushels	43,916,000	Average 1.8 1.6 1.5 1.5 2.1
1914.	2,672,804,000 "	43,916,000	
1915.	2,994,793,000 "	43,916,000	
1916.	2,566,927,000 "	39,863,000 bushels	
1917.	3,065,233,000 "	66,752,000 "	
1918.	2,502,665,000 "	49,069,000 "	1.9
1919.	2,858,509,000 "	23,019,000 "	.8
1920.	3,232,367,000 "	17,761,000 "	.5
1921.	3,080,392,000 "	129,054,000 "	4.2

One-fifth to one-fourth corn exports are to Canada.)

OAT CROPS AND EXPORTS

NOTE.— Average exports ten years prior to war were less than 1 per cent of average crop.

Crop year	Total crop	Exports	Percentage of crop exported
1914.....	1,141,060,000 bushels	97,169,000 bushels	8.5
1915.....	1,549,030,000 "	95,921,000 "	6.2
1916.....	1,251,837,000 "	88,944,000 "	7.1
1917.....	1,592,740,000 "	105,837,000 "	6.6
1918.....	1,538,124,000 "	96,360,000 "	6.2
1919.....	1,231,754,000 "	55,295,000 "	4.5
1920.....	1,526,055,000 "	12,877,000 "	.8
1921.....	1,060,737,000 "	3,224,000 "	.3

If we can put any reliance upon the trend of conditions as exemplified by the tables exhibited above or on the conclusions of the United States Tariff Commission, it is apparent that no great tonnage of grain for export is likely to be available from the United States for the St. Lawrence Canal Route.

APPENDIX J.

Critical examination of the Report of the International Joint Commission concerning the improvement of the St. Lawrence River between Montreal and Lake Ontario, for navigation and power.

By Hon. GEORGE CLINTON of Buffalo

PRELIMINARY.

Before entering upon a critical examination of the report of the International Joint Commission (signed Dec. 19, 1921, and submitted by the President to Congress in January, 1922), it is pertinent to ascertain how the matter came before the International Joint Commission and what was actually referred to it.

To the Rivers and Harbors Bill of 1919 there was added a rider (Section 7), by which the Commission was requested to investigate under the provisions of Article 9 of the Treaty between Great Britain and the United States, signed at Washington, Jan. 11, 1909, "what further improvement of the St. Lawrence river between Montreal and Lake Ontario is necessary to make the same navigable for ocean-going vessels, together with the estimated cost thereof," and to report to the governments of Canada and the United States "with its recommendations for co-operation by the United States with the Dominion of Canada in the improvement of said river." This rider is peculiar in that it departs entirely from the ways of diplomacy and endeavors to put Congress in the position of the Department of State, through which alone the President carries on negotiations with foreign governments and conducts foreign relations. This situation was evidently appreciated by the Executive, with the consequence that on the 21st of Jan. 1920, the matter was taken up under the Treaty of 1909, properly, and the United States and Canada referred it to the Commission for investigation and report upon certain questions relating to the improvement of the St. Lawrence river between Lake Ontario and Montreal, for navigation and power. In the text of the reference the questions are numbered and are stated to be made the basis of an investigation, the Com-

mission not being instructed to furnish its conclusions and recommendations, but being given permission to do so. The purpose of the reference is therefore to secure information primarily, conclusions and recommendations by the Commission being permissive and secondary and therefore to be given only such weight as the two governments may see fit. This is worthy of attention, because the conclusions to be arrived at by Congress and the Executive are to be based upon the facts reported and not upon the conclusions of the individuals composing the International Joint Commission.

In the reference nine questions are submitted for answer, as follows:

I. The first question to be answered is "What further improvement of the St. Lawrence river between Montreal and Lake Ontario is necessary to make the same navigable for deep draft vessels of either the lake or ocean-going type; what draft of water is recommended, and what is the estimated cost?"

The Commission is requested to consider certain things, the first being the navigation interests alone, the second being a combination of navigation and power interests "to obtain the greatest beneficial use of the waters of the river."

The last named consideration submitted to the Commission is blind, and upon construction goes way beyond the constitutional powers of the government. Nowhere in the Constitution is to be found any authority on the part of the United States to take possession of flowing waters for the purpose of creating power. However, the second consideration, taken in view of the first, may be construed as simply meaning that the Commission is requested to consider the plan or plans best adapted to the navigation aimed at, and as between plans of equal merit, that it should also consider and report upon which would develop the greatest amount of water power?

II. What scheme or schemes submitted by the Government or engineers is preferred and why?

III. The general method and order of procedure of carrying out physical and administrative features of improvement?

IV. The basis of apportionment of capital cost between the two countries.

V. The basis of apportionment of the cost of operation and maintenance.

VI. What method of control is recommended for operation?

VII. Whether regulating Lake Ontario will increase the low water flow to the ship channel below Montreal, and if so, to what extent and at what additional cost?

VIII. To what extent will the improvement develop the resources, commerce and industries of each country?

This is a peculiar question to submit to any Commission, because no Commission could possibly answer it with any accuracy. Its solution depends wholly upon what commerce the improved water way would carry, and that solution could not possibly determine accurately the extent of the development of resources and industries.

IX. "What traffic, both incoming and outgoing, in kind and quantity, is likely to be carried upon the proposed route, both at its inception and in the future, consideration to be given not only to present conditions, but to probable changes therein resulting from the development of industrial activities due to the availability of large quantities of hydraulic power?"

This question is very complicated; the first part of it seems to be entirely pertinent and perhaps the last, commencing with the words "but to probable changes." This last request of the Commission to report on probable changes from development of industrial activities due to the availability of large quantities of hydraulic power, involves so many guesses that no Commission, even one of the greatest ability and knowledge of the subject matter, can answer except by way of prophesy, because there are no facts upon which prognostication of the probabilities can be based.

The submission requests the Commission to hold public hearings pending the receipt of the engineering data.

It also provides for the appointment of an engineer by each government to prepare a complete outline of plans for an estimate of the cost of the proposed improvement, including the value of all property, easements, damages and rights connected therewith, the engineers being given a year to furnish the data and the Commission three months after their receipt to report.

A letter of instruction was issued to the Board of Engineers created by the two governments and is, in substance, as follows:

They were to take charge of the survey of the St. Lawrence from Montreal to Lake Ontario for the purpose of preparing plans and estimates for further improvements to make it navigable "for deep draft vessels of either the lake or ocean-going type and to

obtain the greatest beneficial use from these waters." The surveys, plans and estimates are directed to be submitted to the International Joint Commission within twelve months, and the attention of the engineers was called to the fact that the reference to the joint commission contemplates four different schemes of improvement, namely, by locks and dams, by locks and side canals, by a combination of the two or by means of locks and power dams. They were instructed that the plans and estimates should definitely cover the four schemes. The engineers were also informed that the channels to be considered are to be twenty-five and thirty feet depth at low water.

Certain general directions were given and it was recognized and stated in the instructions that the time allowed was not sufficient for the preparation of detailed plans and that therefore merely outline plans "and lump-sum estimates based upon experience from similar work — such as the enlargement of the Welland Canal and power development of Niagara Falls — should be submitted." The general plans were to show, first, the best for navigation alone, and, second, "for the most efficient utilization of the waters of the St. Lawrence for navigation and power, together with the approximate cost thereof." It will be noted that this last phrase, in quotation, places it in the power of the engineers to restrict navigation interests in the interest of generation of power, if they thought that doing so would result in the "most efficient utilization of the waters." This is a subordination of navigation to the creation of power, which operates as an unconstitutional attempt at the exercise of federal authority. Special directions are given as to reporting on the handling and disposal of ice and the regulation of the levels of Lake Ontario so as to equalize the discharge of the St. Lawrence.

I would call particular attention to the fact that these instructions compelled the engineers to report upon so great a work within one year, although it was recognized that the time was insufficient for detailed plans or accurate estimates, and that they call for "outline plans and lump-sum estimates." From this it follows that the report of the engineers is necessarily useless for the purpose of arriving at the best plan, and worse than useless so far as arriving at a proper engineering estimate of cost, because misleading. In its report the International Joint Commission (Senate Document No. 114 — 67th Congress, 2nd Session, page 13) recognizes this condition of affairs, for it says "in the

opinion of the Commission a period of twelve months was entirely inadequate to the requirements of an engineering problem of such exceptional character and magnitude." The inevitable conclusion is that the engineers' report, while illuminating upon some of the phases of the questions presented, is worth no more, so far as a determination of a plan to be adopted and the probable cost are concerned, than the guess of two competent engineers based on documentary evidence and the experience of others, and not upon adequate surveys, plans and specifications from which cost could be determined and a plan of action settled. Before Congress can determine what action it will finally take, and before a treaty should be negotiated, it is absolutely necessary that it should have before it the opinions of its official advisers, the Board of Engineers, as to the best plan which could be adopted and an estimate of cost as accurate as possible. Without this any action in the direction of adopting a plan or determining whether the benefits will warrant the cost would be a proceeding in the dark and the pledging of the Government to an undertaking, the cost of which is unascertained. The people should not be burdened with taxation in any such manner, nor should the danger of hindering the proper improvement of inland waterways and the jeopardizing of the interests of vastly the greater part of the United States be incurred.

GENERAL CONSIDERATIONS.

Before critically examining the report of the commissioners, it is well to have certain things in mind:

1. The construction of some waterway which will enable ocean-going vessels to navigate the St. Lawrence from Montreal to Lake Ontario, is, as a matter of common sense, perfectly feasible.

2. We have no proper basis for an estimate of cost, and cost is one of the most serious elements to be considered in determining whether the benefits will warrant canalization.

3. The real question is whether the people should be taxed for an enormous amount in order to accomplish the improvements asked for by a certain class of people in certain localities, and this includes consideration as to whether by far the greatest part of the United States, territorially and industrially, will be benefited, and also whether great portions of it will not be injured; also whether needed and just improvements of inland waterways and harbors will not be retarded.

4. In connection with the estimate of cost, it must be remembered that adequate improvement of the connecting channels and harbors of the Great Lakes will have to be reckoned with, and no estimate whatever can be made that will be worth the paper it is written upon until a definite plan for canalization of the St. Lawrence has been determined upon so that the possible draft of ocean-going vessels can be ascertained and the required lake and harbor improvements arrived at. Therefore, a definite plan and estimate of cost of canalization is the necessary first step (and it has not been taken) to be followed by an estimate of lake and harbor improvement cost, before Congress can intelligently arrive at a conclusion whether it will proceed further in the matter.

5. After a definite plan of canalization has been laid before the President and Congress, with a reasonably accurate estimate of cost, the question will then be presented as to the extent to which navigation of the Great Lakes, with or without improved channels and harbors, will be indulged in by ocean-going vessels. A careful consideration of water transportation will persuade any unbiased mind that ocean-going vessels will not to any extent navigate the Great Lakes, and, further, that they cannot do so in competition with lake navigation by vessels adapted to it, supplemented by a thousand ton barge connection between the Great Lakes and tidewater. A full discussion of this subject, however, is not pertinent to the purposes of this paper.

Before taking up the Commission's report I wish to say that the personnel of the Commission, as well as that of the engineers, and of certain gentlemen who have written a partisan book which seems to have been the text for the conclusions of the Commission, is a fair subject for question. I do not refer to integrity or general ability and fairness, but to training and surroundings which qualify those individuals to accumulate and digest needed information and facts, and upon them to formulate opinions entitled to any great weight.

As to the engineers, it is sufficient to say that there is no question as to their ability, fairness or training; they are engineers of the highest standing and have done their duty, even under the restricted conditions which prevented their report from being entitled to any weight so far as definiteness of plan or cost is concerned.

As the Commission has evidently been largely informed by a certain book published in 1921 by the Ronald Press Company,

prepared by Roy S. MacElwee and Alfred H. Ritter, it becomes pertinent to inquire as to the personalities of the authors with a view to ascertain what weight is to be given to their opinions. The book itself will be discussed hereafter. I have been unable to find out who the authors are and do not understand why the Commission speaks of MacElwee as "The Doctor." It is quite apparent from the book itself that the authors cannot be regarded as authorities upon the questions of transportation which are vital to a decision whether the St. Lawrence shall be canalized or not. The book was evidently prepared for the purpose of propaganda favoring the St. Lawrence scheme. No one can read it without coming to this conclusion and to the further conclusion that the authors had the assistance of men who are advocating, by oratory or otherwise, that scheme; it does not appear that the active assistance of real experts in such matters was sought. In the foreword the authors acknowledge the receipt of valuable information "regarding various phases of the proposition" from the public utterances and special papers by Mr. Hoover, Julius H. Barnes, William C. Redfield, George S. Roberts, Senator Irwin L. Lenroot, Senator Charles E. Townsend and Congressman A. P. Nelson, "and many others whose names appear in this report and in the records of hearings before the International Joint Commission." A more explicit statement of facts showing the animus of the book could not be made. We therefore have two men writing a book for the purpose of advancing a particular scheme, who are not shown to be competent to consider the vital questions involved, or express opinions thereon, and consequently what they say must be judged wholly from the value of the facts they state and not from their conclusions.

As to the personnel of the Commission I am perfectly willing to admit the general ability of the commissioners representing the two governments, but I know of no special ability or training which they have that makes them competent to give advice on the subject on which they reported that is entitled to any more weight than that of the ordinary, intelligent individual who has before him the facts which form the basis of the commissioners' report. Indeed, the residence of the commissioners would rather negative any particular knowledge or training specially fitting them to pass upon questions of transportation by ocean vessels. Of the American Section we find one commissioner from Rockland, Maine, one from Wyoming, and one from Arizona, and on

the Canadian side we find two from Ontario and one from New Brunswick. Two of the Canadian commissioners appear to be lawyers, one, for whom I have the highest regard, comes from Ottawa. The opinions of such a commission on the complicated questions before them are entitled, of course, to consideration, but not to any very great weight.

THE ENGINEERS' REPORT.

A critical examination of the commissioners' report requires an understanding of the report of the engineers and also of the Mac-Elwee-Ritter propaganda book; the engineers' report being of great importance is entitled to the most careful consideration. Colonel Wooden and Mr. Bowden are both of the highest standing as engineers and their ability and entire fairness is beyond question. We must, however, take notice that they were utterly unable within the time granted them to make such careful and specific surveys, investigations, plans and details as would enable them to definitely and finally recommend a specific plan, without alternatives, and to estimate the cost upon a proper basis. They were confined to such information as they could gather from Canadian and United States official surveys, documents and charts, supplemented by personal observation. Beyond this, they were specifically instructed to make "*merely outline plans and lump-sum estimates, based upon experience from similar work.*" (Letter of instructions to engineers.) It was not expected that they would be able within the year to make such investigations, that they could do any more than prepare "outline plans" and furnish "lump-sum estimates" of this work to simply give an idea of what could be done and a guess (for it could be nothing more) at the cost. The engineers, as in duty bound, simply followed out their instructions, and their report, therefore, cannot be regarded seriously as giving an estimate of cost that they or any other engineers or men conversant with such work would for a moment take as reliable, inasmuch as detailed plans and specifications are absolutely necessary to form an estimate that could be relied upon as giving minimum cost.

It is pertinent, however, to examine the report for the purpose of ascertaining just what the "outline plan" and "lump-sum estimate" of the engineers was, as that is the material that was before the Commission when it prepared its report.

Before doing this, however, I would call attention to the fact that the engineers specifically state (paragraph 9) that as what the amount of diversion at Chicago will be is uncertain, they have not taken it into account. This element is a most important one as bearing upon the extent of the improvement of channels, the depth of canals, the height of dams and the amount of power that may be generated. It also has a distinct bearing upon the character of structures and consequently of cost. However, as the report does not take into consideration the Chicago diversion, it must be examined as though none existed or would exist, notwithstanding that the results arrived at are entirely unreliable so far as plan and cost are concerned. The engineers are not to blame for this, because, as they say, the amount of diversion of the Chicago Sanitary Canal is uncertain and therefore unascertainable; they had to proceed upon what they had at hand, although it was possible for them to report varying results in accordance with assumed diversions at the southerly end of Lake Michigan. The subject of the effect of the diversion at Chicago was thoroughly considered by the International Waterways Commission, and the effect upon all the lakes and the waters of the St. Lawrence by the diversion of ten thousand c.f.s. was carefully worked out and stated. (Report of the International Waterways Commission to the Secretary of War, January 4, 1907.)

In their outline plan the engineers describe a general scheme which they regard as the best, and give alternatives, which they do not approve, for portions. I, therefore, shall disregard the alternatives.

Their report is based upon two depths, twenty-five feet and thirty feet, with the lump sum estimates of the cost of the lesser depth and additions to be made for the greater. As twenty-five foot depth will be utterly insufficient for ocean-going vessels of a burden great enough to meet the views of the advocates of canalization and great enough to warrant any ocean-going vessel to undertake to reach the lakes and engage in competition with lake and rail and lake and canal traffic, I shall discuss the report as though it related solely to thirty foot depths.

The report divides the distance from the harbor of Montreal to the deep water channels above the most southerly rapids into four divisions, apparently on account of the different physical conditions existing.

First Division.

This extends from Montreal harbor to deep water in Lake St. Louis, a distance of approximately fourteen miles (scale from map annexed to commissioners' report). It is known as the Ville Emard route as recommended by the engineers. This canal is, of course, wholly in Canadian territory and is, from the harbor of Montreal to the point where it enters Lake St. Louis, about three and one-half miles long (same scaling). The canal has three locks, one of which is a guard lock. The dimensions of the canal (taken at thirty foot depth) will be 220 feet in through cuttings. The bulk sum estimate of cost for this division is \$68,727,000. The annual cost of operation, maintenance and depreciation is estimated at \$350,000. There is no provision for water power development.

Second Division.

This division extends from deep water in Lake St. Louis to the outer end of the breakwater at Lake St. Francis, the terminus of the proposed ship canal between Lake St. Louis and Lake St. Francis. It is a canal approximately seventeen and one-half miles in length (same scaling). The canal curves southerly attaining a distance in the neighborhood of five miles from the main channel of the St. Lawrence and about four miles from the southerly channel between the mainland and Grande Isle, and is wholly in Canadian territory. The bottom width of the canal is 220 feet. The lump-sum estimated cost for the canal and necessary dams is \$55,190,000. The estimate of operation, maintenance and depreciation is \$400,000. On the connecting canal there are three locks, one of which is a guard lock. By this improvement it is suggested that 1,560,000 H. P. could be developed from the power created by a dam at point AuBiron, at a cost of \$124,468,000.

Third Division.

This division extends from Lake St. Francis to the head of St. Regis Island, and it is proposed to improve this by dredging a channel 450 feet wide. The bulk-sum estimate of cost is \$1,820,000 for thirty foot depth. The distance is approximately twenty-eight miles.

Note.—The length of Lake St. Louis between divisions Nos. 1 and 2, a part of the total waterway, is approximately twelve miles.

Fourth Division.

This division extends from the lower end of St. Regis Island to Chimney Point, a distance of approximately forty-eight miles. A part of this distance is covered by a canal in Canada extending to a pool to be created by a dam, hereinafter spoken of, above Cornwall to the river at that place. This canal is, from the guard lock to Cornwell, seven and one-half miles; it is of the same general dimensions as the other canals. It has two locks and a guard gate. There is also a side canal from about Waddington to the main river channel in the pool created by a dam from Ogden Island to the Canadian shore and on from that island to the American shore at Waddington. This canal has a lock.

The plan recommended is to create pools by the construction of dams at about the foot of the Long Sault Rapids and the dams above mentioned at Ogden Island. Power works are provided for. The plan also contemplates the necessary enlargement of the channel below Cornwell to the foot of St. Regis Island, and in the stretch between the head of Ogden Island and deep water above Gallop Rapids. The lump-sum estimated cost of the project, including the hydraulic and electric plants, is \$160,367,380. The total cost of operation, maintenance and depreciation is \$1,762,000, namely, \$1,457,000 for the development of power and the remainder, \$305,000, for navigation operations.

Fifth Division.

This division extends from Chimney Point to Lake Ontario, a distance of sixty-five miles. This stretch of river requires the removal of certain shoals and widening and straightening of the existing channel. The lump-sum estimated cost of the work is \$100,000, and the annual cost of operation and maintenance is \$20,000. The general depth of the river in this stretch is about thirty feet.

TOTAL LUMP-SUM COST.

The engineers figure the total lump-sum cost of the entire improvement, including the power development at the Long Sault, for a thirty foot channel, at \$270,714,480. No separate figures are given for the cost of the power.

The plan recommended includes nine locks, to which must be added the seven locks of the improved Welland Canal when that work is completed; to reach Lake Superior the locks at the Sault

will have to be deepened to accommodate the standard depth of thirty feet, as also will channels connecting the Great Lakes and the principal harbors. There is no estimate of these improvements furnished by the engineers and therefore nothing upon which the total cost to the United States for making the Great Lakes navigable for ocean vessels can be estimated, even in lump sum form.

There is another element of cost of construction which does not seem to have been considered by the engineers. Administration, during construction, will undoubtedly cost many hundreds of thousands of dollars. Many expert engineers will have to be employed, as well as a large clerical force and a very large force of expert inspectors will have to be put upon the work.

There is still another source of expense, no figures for which have been given, or could be given, with any accuracy, by the engineers, and that is the amount that will have to be paid for property either taken directly or damaged or permanently occupied by flowage. A very large amount of property will have to be taken by Canada in the first and second divisions, for canal construction and property will have to be taken for the purpose of constructing the various dams and the short canal in the fourth division. Property will have to be taken and expense will be incurred for the changes in the lines of railroads and the construction of new bridges recommended in the report. In addition to all this, there will be a great amount of flowage in the fourth and fifth divisions and parts of villages on the Canadian and American sides will be flooded, hydro-electric plants will be put out of commission and in at least one case of village flooding, Morrisburg, there will be very considerable expense incurred in protecting the property by dykes and special arrangements for sewage and storm waters. Some of this last may possibly be included in the estimate for the fourth division, but it is not so stated in the report and no figures are given, none could be; the actual flowage is figured by the engineers at twenty-four square miles. It is, therefore, quite plain that the expense now being considered will run well up into the millions, and must be approximately ascertained before cost can be arrived at with any approach to certainty.

Still another element of cost has not been included. Several hundred million dollars will have to be withdrawn from the treasury of the United States, and this will be in the nature of

an investment. As the moneys cannot be applied directly or indirectly to the reduction of the government's tremendous indebtedness, the interest, say, five per cent, must be regarded as an element of cost. Annual interest at five per cent on one hundred million dollars is five million dollars. If the total amount expended by the United States reaches, as it undoubtedly will, at least two hundred and fifty million dollars, the interest account will run up to twelve million five hundred thousand each year. The amount, when ascertained, should be added annually to the cost of maintenance.

We would here call attention to the fact that, at the Ottawa meeting of the Commission, Mr. Cooper, the leading hydraulic engineer of the country, stated that the figures of the engineers showed the total cost of power and navigation as estimated by them between Montreal and mile 120 to be \$506,000,000, but that in his opinion it would be in excess of \$1,000,000,000.

COST OF MAINTENANCE.

The annual cost of maintenance to the United States, at the lump-sum figure of the engineers, is as follows:

One-half first division.....	\$175,000
One-half second division.....	200,000
One-half third division.....	15,000
One-half fourth division.....	728,500
One-half fifth division.....	10,000
Total	<u>\$1,128,500</u>

The engineers give the cost of maintenance, etc., on the fourth division as \$1,762,000, of which \$1,457,000 is charged to power development, leaving \$205,000 chargeable to navigation. If arrangements are made by which the expense of operation, maintenance and depreciation is borne by lessees of the power, the total cost of maintenance, operation, etc., to the United States will be reduced to \$502,500.

RESULTS.

The results at which we inevitably arrive from the engineers' report are as follows:

I.

Cost.

It is impossible to arrive at cost to the government of the United States to canalize the St. Lawrence river and fit the lakes and principal harbors for the navigation of ocean-going vessels, within \$200,000,000, from the report.

II.

Canadian Horsepower.

The lump-sum figures for power development at various points, as determined by the engineers, wholly in Canada, are as follows:

	Cost.	Horsepower.
In the first division.....	\$81,694,000	40,000
In the second division.....	124,468,000	1,500,000

The engineers do not recommend the putting in of plants in divisions 1, 2 and 3, and therefore the cost need not be taken into account, but the work to be done for which the United States will have to pay one-half will leave to Canada nearly 1,600,000 horsepower, which can be created at an expense for plants only by an expenditure of \$206,162. This will give Canada the full benefit of the expenditure by the United States of one-half of the cost of construction in Canadian territory, for the development of power. I have figured the proportion to be paid by the United States at one-half, but if the proportion is based upon United States tonnage, we will have to pay a much larger part.

The plan involves construction which will develop 1,457,000 horsepower on the fourth division, which is on the boundary between the two countries. The expense of the electric plant is not given separately. Of this power the United States will get about 729,000 horsepower. This power is not at present capable of economical transmission to any great manufacturing center, but possibly can be used to advantage in the vicinity of the place of generation, and it follows that those best situated to bid for the power will be the very corporations and interests which for years have been endeavoring to secure the power at the foot of the Long Sault rapids for their own purposes. The general public will get no special benefit. I may add that these same corporations and interests control not only the American, but the Canadian side of the river at the point where the power

will be created, and that the result will be that they will absorb the entire 1,457,000 horsepower. In other words, the generation of the power at the foot of the Long Sault will be for the benefit of private enterprise and the benefits will not be distributed to points not within their control. This is a consummation which goes beyond what the real beneficiaries originally expected; it was their purpose and their offer to construct works, navigation and power, at the foot of the Long Sault, at their own expense, giving the control of the levels to the United States and Canada, for navigation purposes. The present plan will relieve them of the great expense of damming the river in order to create the power. Whether the private interests involved are promoting the scheme ought to be a subject of investigation.

III.

Special Advantages to Canada.

The nature of the improvement recommended includes about 34 miles of artificial canal with a bottom width of 220 feet for thirty foot depth and of submerged canal a width of 456 feet. This is all in Canadian territory and would be a magnificent improvement of the Canadian waterways, an important consideration when investigating the economic questions as to the use of the waterways by ocean-going vessels. If ocean-going vessels use the waterway and the Great Lakes to an extent that would warrant construction, Canada would have the additional advantage of many miles of vastly improved navigation within its own territory to be used for other purposes than through commerce, a free gift by us.

IV.

Locks.

Aside from guard gates, there are on the proposed construction nine locks and on the Welland Canal there will be seven locks, making sixteen in all. To reach Lake Superior ports vessels would have to pass through an additional lock.

V.

Final Conclusion.

The final conclusion from the report is that it presents what may be the best plan for the improvement of navigation between Montreal and Lake Ontario, having in view the interest

of navigation first and the development of electric power second. But the report is absolutely barren of detailed plans and specifications and the cost given is therefore not much more than a lump sum guess, as required by the letter of instructions to the engineers, and that lump-sum leaves out the tremendous cost of improving the lake channels and harbors, the overhead cost and the construction administration cost, as well as the interest on the money invested. There can be no reasonable doubt from past experience that five hundred millions is a low estimate of the total cost and that the United States will have to pay, on the basis of one-half, at the very least two hundred and fifty million dollars, on the basis of tonnage, in all probability from fifty to a hundred millions more.

The question here arises, what will become of the improvement of our inland waterways and of our harbors if the United States is called on to pay out this immense amount of money on the St. Lawrence scheme.

I have taken a thirty foot depth as the basis of the plan recommended by the engineers, for the reason that while many ocean-going vessels draw only twenty-one feet, they carry altogether too small cargoes to warrant their navigating the narrow channels of the St. Lawrence and the lakes and make the lockages required, at a cost that would enable them to charge rates competitive with the present routes of the middle and northwest by rail, lake and rail or lake and canal. The fact is that steamers which do the bulk of the European transatlantic carrying trade draw loaded twenty-seven feet of water, and such vessels require at least three feet of water under the keel if they are to make any reasonable speed, say four miles an hour through constricted channels.

Results

It is pertinent here to consider what the navigation conditions for ocean-going vessels would be if canalization of the St. Lawrence were completed on the engineers' plans, or any of like nature. An ocean vessel entering the St. Lawrence would have deep and wide waters as far as Father Point, where pilots are taken on and discharged, a distance of 669 miles. In the Gulf she will be met by violent cross currents, shoals, rocks, fogs and ice, necessitating, the greater part of the time, most careful navigation, which would greatly limit the speed. The dangers are not imagined. They exist, as shown by charts, the experience

of navigators and the disasters which have occurred. Between Father Point and Montreal the ship channel has a minimum depth of 30 feet, with varying widths, the entire distance being 317 miles. (Bulletin No. 29, Survey Northern and Northwestern Lakes.) The westerly end of this stretch is Lake St. Peter, a shallow lake with a dredged channel through it and the river to Montreal, a distance of $15\frac{2}{3}$ miles. When the ocean vessel reaches Montreal she has passed through all the dangers above noted and through the comparatively narrow and shallow channels described, at a great loss of time and a great increase of insurance expense over that imposed upon vessels navigating between European ports and those on our Atlantic coast. This is the reason why Montreal's general commerce has not approached that of our greater Atlantic and Gulf ports.

Our ocean vessel, having reached Montreal, and bound, say for a Lake Erie port, would have to pass through 34 miles of inland canals, and submerged canals having a depth of thirty feet and a width on the bottom of 220 feet. Through these canals she could not, with any safety, make, or attempt to make, more than on the average, four miles an hour. Passage through the canals, therefore, would require over eight and one-half hours. Through the deep water of Lake St. Louis she could make probably ten miles an hour for the distance, twelve miles, the time being one and one-fifth hours. To and through Lake St. Francis, a distance of thirty and one-half miles, to the foot of St. Regis Island, she could make possibly six miles an hour safely, in all five hours. From St. Regis Island to the canal at Cornwall, a distance of about six miles, the channel would be constricted and intricate to some extent and she could make about eight miles an hour, in all three-fourths of an hour. From the head of the proposed canal at Cornwall, through the pool created by the dams at the Long Sault, she could safely make, with a thirty foot depth, probably eight miles an hour and the distance to about Ogden Island being nineteen miles, she would cover it in two and one-half hours. From the point last named (if the tortuous channel was sufficiently straightened, widened and all obstructions removed) she could make here probably nine miles an hour on the average to and into Lake Ontario, a distance of about eighty-one miles or nine hours, and through Lake Ontario to the entrance of the Welland canal, a distance of one hundred and sixty miles, at ten miles an hour, occupying sixteen hours in the transit. The

improved Welland canal will be twenty-five miles long and the average speed, exclusive of lockage, could not exceed four miles an hour, so that the time required for passage will be about seven hours. From the southerly end of the Welland canal, to, say, Lake Erie ports or Detroit, she would make an average of ten to twelve miles an hour. The distance to Buffalo is inconsiderable, to Cleveland it is one hundred and sixty miles and to Detroit it is two hundred and forty-four miles. To enable the vessel to reach Detroit, assuming that she is an ocean vessel of cargo paying capacity, the channels below Detroit would have to be deepened to in the neighborhood of thirty feet. The time required to reach Detroit from the improved Welland Canal would be twenty-four hours, and to reach Cleveland would be sixteen hours. Assuming that the narrow channels between Detroit and Lake Huron are deepened to the required depth, the vessel would require for the distance from Detroit to the Straits of Mackinac, a distance of three hundred and eleven miles, thirty-one hours, as she could not be expected to make more than an average of ten miles an hour for the whole distance. Through the straits, up Lake Michigan to Chicago, a distance of three hundred twenty-four miles, she could make ten miles an hour and would take about thirty-two hours to reach that city. She could not utilize the port of Chicago until sufficient depth and accommodations have been provided. If the vessel were going to Duluth or other Lake Superior ports, she would have to pass through an additional lock (improved to meet her draft) and would cover (Detroit to Duluth) a distance of seven hundred and twenty-seven miles at an average rate of ten miles an hour, taking seventy-two hours. She could not use the port of Duluth until the necessary expensive improvements to accommodate her had been made. As the average loss of time in passing a lock is one hour and a half, there should be added to the times of transit given, twenty-four hours for passage through the sixteen locks between Lake Erie and Montreal harbor, and an additional hour and one-half if the vessel were going to Lake Superior, for the lock at Sault Ste. Marie. During the entire period of this navigation the utmost care and skill would be required in the narrow channels, due to slow speed, danger of sheering from bottom and bank suction and danger in passing other vessels, large and small. The difficulties and dangers of such navigation for the ocean vessel cannot be overestimated.

The time from Montreal to the ocean via Cabot Straits, with no delays from weather, etc., is seventy hours.

We find, therefore, that from the entrance to the Gulf of St. Lawrence, the actual time required under the most favorable circumstances would not be less for the ocean vessel than as follows:

	Hours.
To Cleveland	160
To Detroit	168
To Chicago	231
To Duluth	241½

In giving the above figures we have assumed clear weather, have made no allowances for passages at night, have made no allowances whatever for more than the passage of one vessel and consequently have not taken into consideration at all delays from and dangers from passing vessels meeting or going in the same direction, nor from congestion if the traffic at all meets the expectation of the advocates of canalization, nor from delays in inland canals, especially at the locks, due to the collection, through weather or other causes, of vessels waiting for lockages. Bad weather, fogs, ice conditions, etc., obstructions in the narrow channels from accident, etc., would greatly lengthen the time of passage. (For further details on this subject see discussion of Chap. VII of the MacElwee-Ritter book, where it is taken up *in extenso*.) To arrive at a fair estimate of time we ought to add about one-third, which would make the time from the entrance to the Gulf:

	Hours.
To Cleveland	213
To Detroit	226
To Chicago	308
To Duluth	321

When we consider that the D. W. T. of the ocean vessel on a draft of twenty-seven feet, is only about 9000 tons, that cargo capacity of our modern lake vessels is ten thousand tons on about twenty foot draft, and that barge canal boats can navigate from Detroit, and from Toledo, Cleveland and other Ohio ports, and from Buffalo to New York, carrying (in fleets) five thousand tons and more, and when we further consider that the time that can be made from Duluth or Chicago by lake, canal and the Hudson

river to New York is only about ten days, by lake steamers and barge canal boats, and further, that the overhead and operating (including crew) expense, as well as cost of construction (investment) is so much greater than upon the lake vessels and canal barges, it must be apparent to an unbiased mind that ocean-going vessels cannot use the St. Lawrence-Great Lakes route in competition with the present water route.

Not only are the elements of tonnage and time heavily against ocean vessels engaging in St. Lawrence and lake commerce, but the cost of carriage is also against them. Upon the deep waters of the ocean, vessels can carry freight at a cost of about five-tenths of a mill per ton mile, as nearly as it can be reckoned at present; lake vessels can carry at about seven-tenths of a mill under normal conditions and barge canal boats can carry at eight-tenths of a mill. The carriage by ocean vessels per ton mile in the constricted channels and on the lakes must certainly be greater than that of lake vessels per ton mile on account of their much greater cost and their very much greater overhead (including officers and crew) expense. This statement needs no explanation to any one engaged in, or conversant with, the carriage of freight by ocean-going and lake vessels. If there be any doubt as to its correctness in the mind of any person, he can readily verify it by communicating with those actually owning or handling vessels of the different types engaged in commerce. Applying these figures to carriage by the St. Lawrence and to lake, canal and river routes it will be found that the cost of carriage to and from the ocean will be greater on the St. Lawrence route than on the latter, and when we consider the great difference in tonnage in favor of the lake-canal route, there can be no reasonable question but what ocean vessels will be unable successfully to compete with the established water line of transportation between the upper lakes and the ocean.

THE ENGINEERS' PLAN.

I have said that the engineers' report presents what may be the best plan of improvement for purposes of navigation, having in view as a secondary consideration the development of electric power. In making this statement I refer to the general plan and not to the details of construction. It is true that ice conditions have not been given sufficient consideration by the engineers in placing dams, in their construction and in the provisions made

to prevent injury by ice and to provide for safe passage as speedily as possible during natural conditions of the river. The engineer who stands at the head of his profession, so far as works of this character are concerned, Mr. Cooper, demonstrated at the meeting of the Commission in Ottawa that the location of dams and the character of the works recommended by the engineers was not at all adapted to caring for ice conditions, and that the destruction of recommended structures by ice was a certainty. This is, of course, a matter of detail, but it proves conclusively that the engineers have been unable to furnish a plan which will meet all the conditions, and that, therefore, no action should be taken by the Executive or Congress until some definite practical plan for dams and structures in the fourth division has been worked out, so that a reasonable estimate of cost can be arrived at.

THE MACELWEE-RITTER PROPAGANDA.

The gentlemen above named, as I have stated, have written a book, apparently under the tutelage of the advocates of St. Lawrence canalization. I propose, as concisely as possible, to point out that the book cannot be regarded as authority, so far as the questions which were before the Commission are concerned. I shall not criticize statistics, but merely point out that there is nothing in the book beyond assertions of the authors that touches on the vital matters involved. In doing this I will take up the work by chapters, omitting chapter 1, which simply gives the scope of the investigation.

Chapter 2.

This chapter seems hardly to be worthy of consideration at all. It states historic and well known statistical facts that are matters of common knowledge, but in the heading we find a statement which is not susceptible of proof and does not take into consideration normal conditions of railway traffic. It is "cost of transportation by rail has now reached the point where a thousand mile haul across the country wipes out the margin of profit on many commodities entering largely into our foreign commercial relations, and serves to limit the market for many others." This ignores the fact that railroad transportation is in an almost chaotic condition so far as expense is concerned and that this condition is a result of the war and railroad administration by the government, which has almost wrecked the credit of our great

trunk lines and has been the occasion of car shortage and congestion, and it does not take into consideration the situation that will exist when normal conditions are again reached. I may add that it has no bearing whatever upon water transportation and is not germane to the subject under consideration.

Attention is called to the fact that the statement is backed up by nothing worthy of consideration when we come to determine whether the advantages of St. Lawrence canalization will warrant the cost, the effort is to show merely that the railroads cannot profitably take care of the agricultural products of the sixteen states urging canalization. Their interests will be better taken care of by the cheaper lakes and canal routes. As to industrial products there is nothing but a little oratory. There is one statement (page 13) which characterizes the nature of the propaganda: They say, "during the last few years the world has been begging for our products and was willing to pay any money to obtain them." A more ridiculous and unwarranted statement has never been made by any one acquainted with foreign trade conditions. The world, indeed, is and has been anxious to get our products, but only if it could obtain them at prices cheaper than they could obtain the same article at home or from other sources; there has been no "begging for our products," the principles governing trade and commerce are fixed and will remain so in spite of Ritter-MacElwee.

Chapter 3.

This chapter relates to facilities shortage by rail. Whether the statistics are correct as to the actual shortage of freight cars I do not know, but assuming that it is correct, the shortage has nothing to do with water transportation by the cheapest and most speedy route. I would call attention here, as bearing on the origin of the book under consideration, that in this chapter the authors quote liberally from advocates of canalization. The causes of shortage of cars have been spoken of above and that it will continue when normal railroad conditions return is not to be regarded as even a probability.

Chapter 4.

In this chapter our inexpert authors rather pompously announce in the title "the remedy for the defects in our transportation system." The solution which they present is "the opening of

new routes to relieve the existing routes and gate-ways of the surplus traffic." Any one, knowing that there was congestion upon the railroads at present and that industrial production in the United States had been rapidly increasing and would again be when business conditions became settled, would know that this statement is a truism, not requiring the citation of statistics or its presentation by the learned authors. However, it is admitted by the authors that water transportation has a flexibility of operation not shared by the railroads. One would imagine that the application of this well known economic principle would have resulted in advocacy of the improvement of our internal waterways, for our domestic commerce and the furnishing of ready means of transportation in all sections of the United States, by water, to the ocean, are of vastly more importance than the construction of a waterway from the ocean to the Great Lakes by the St. Lawrence. The industries, manufacturing, agricultural and mining involved are incalculably greater than those of the sixteen states which Ritter-McElwee represent, and the prosperity of the United States is much more deeply involved in the improvement of inland water transportation than in the construction of that single impractical waterway by the St. Lawrence. These greater interests should not be sacrificed for the selfish and uneducated designs of the St. Lawrence advocates.

There is one statement in the heading of this chapter which begs the entire question and remains without any proofs. It is "the opening of the Great Lakes to ocean vessels would provide a dependable outlet for the products of our chief surplus producing areas, and would decrease by fully fifty per cent the average rail haul to and from shipside." This is the very question which the Commission was to determine and it was hardly within the province of the authors to dispose of it so summarily. That they were not quite sure of their position is apparent from the last paragraph of the chapter, which the authors have put in italics. It is, "therefore it is *with prayerful hope* that one turns to the project of the proposed St. Lawrence ship channel as affording the most available solution of the problem of providing economical transportation for this great region." The great region are the sixteen selfish states and the "prayerful hope" indicates that the authors did not regard themselves as equipped or competent to determine whether the St. Lawrence ship channel would afford the solution desired.

Chapter 5.

This chapter relates to the handicap of inadequate terminal facilities. Assuming that terminal facilities are inadequate, the remedy is to secure their efficiency, not to construct a new channel of transportation, unless that channel will be successful economically and relieve terminal congestion. It is well known that our Atlantic ports are taking hold of this matter and that New York city in particular, operating in connection with New Jersey, has launched upon a magnificent plan for the increase of harbor terminal facilities in connection with both railroad and ocean carriage, and it is also well known that the State of New York is engaged in furnishing harbor facilities for commerce passing over the Erie canal and down the Hudson river, and particularly in the port of New York. The authors give no consideration to these matters. Why?

I would call attention to the fact that the great Lakes Barge Canal route has terminal facilities at Buffalo, Oswego and New York city, furnished by the State of New York, which are in constant process of increase by the State. Perhaps this also is of no importance. But all this has nothing to do with the real questions before us, except that a successful ocean route by way of the St. Lawrence and Great Lakes would eliminate, by transfer, that at Buffalo. Commerce from Detroit and Lake Erie ports to New York by vessels which the Erie canal and Hudson river will accommodate, would have only one transfer, at New York city, that at Buffalo being eliminated. Then, too, so far as freight is concerned, there would not necessarily be any transfer at New York city except directly from barge to vessel.

The authors suggest no remedy for the rail congestion at Atlantic ports, but advocate an expenditure by the United States that will amount to \$250,000,000 at least in the construction of a new water route which cannot be shown to be practical commercially, the expenditures necessarily decreasing, and in some cases probably preventing, needed appropriation for coastal harbor improvement which will aid in relieving the very congestion so meticulously announced by the authors.

Chapter 6.

This chapter relates to the character of water transportation. It furnishes no basis for answering the question, "Will ocean vessels to any extent navigate the canalized St. Lawrence and

the Great Lakes?" The substance of it is that bulk freights constitute the much greater portion of the cargoes transported on inland waterways, and that high class manufactured articles now go by rail from the West to ocean ports and will continue to go so; it ignores the fact that with the improvement of some of our great rivers and by the Great Lakes and the Erie Barge canal even high class freights can be carried to the ocean successfully at rates lower than by rail and certainly lower than by ocean vessels. The authors, as in the case of terminals, take present conditions. They make a statement which again begs the question, saying, "In case the ocean carrier is able to penetrate into the Great Lakes, great saving of cost and great facility in the conduct of business will result," and they add that the improvement of the St. Lawrence River "is the only solution of the problem of providing adequate transportation facilities for the vast territory tributary to the Great Lakes." Those who make these assertions assume the position of prophets, not confining themselves to a discussion upon settled facts of the problems involved.

Chapter 7.

This chapter is devoted to transportation between upper lake ports and Liverpool, and purports to be based on studies made by the United States Shipping Board of the cost of operating freight vessels of standard type, and the authors claim that with no allowance for the additional time consumed in the trip from Liverpool to lake ports, as compared with the trip via New York, and with insurance and certain other items increased to meet the new conditions, it is found that rates far below those now existing between the Great Lakes and Europe could be made and afford the vessel a satisfactory revenue on her operations. Another assumption is that it is to be anticipated that vessels would be able to make the same rates to Lake Erie ports as to north Atlantic coastal points and the same rates to Lake Michigan and Lake Superior as to Gulf ports.

The statements given in this chapter are based entirely on existing conditions and do not take into consideration the cheapening of transportation *by lake vessels* on the Great Lakes by deepening the channels to accommodate ocean-going vessels that can carry cargoes comparable with those now carried by large lake freighters. This is a vital element which the authors give no consideration.

If we assume that the statement that carriage by ocean vessels to upper lake ports can be made at a profit for the same rates as to Gulf ports, then we have the element introduced of the United States spending \$250,000,000 or more to create competition, not only with Atlantic coastal ports, but directly with the Gulf ports. There is evidently no selfishness on the part of the advocates of canalization of the St. Lawrence!

A few remarks in regard to the figures given may be pertinent here. The authors assume for 8,800 D. W. T. capacity steam ships a draft of 24 feet 2 inches and a sea speed in knots of $9\frac{1}{2}$ (about 11 statute miles), and a maximum cargo capacity of 7,500 tons. These elements are of importance in determining the vital economic questions involved.

The authors' figures as to the operating cost, wages of officers and crew, I assume to be nearly correct, although such items are subject to change. It is recognized that the entire personnel of the ocean vessel is at least two-thirds more than the number required by our large lake vessels and on the latter the entire number of officers and crew averages thirty. This would make the total number required for operation of ocean vessels at least fifty. The crew cost of the ocean carrier is, therefore, much in excess of that on the lake carrier, and many times the crew cost of canal barges.

The authors in considering insurance avoid the real question, which is cost of transportation to the shipper, inasmuch as they deduct from total insurance that on cargo. This is either an evasion or an oversight. The shipper has to pay freight and he also has to pay insurance on cargo and that is the cost of transportation. Their figures on cost of transportation are, therefore, in this respect, patently incorrect. They also neglect, or rather underestimate, the great excess of cost of insurance upon vessels and cargoes proceeding by the way of the St. Lawrence and the Gulf to Montreal; the truth is that such insurance costs from 120 per cent. to more than 300 per cent. over the New York rate, according to the season of the year, and some companies refuse to insure at all.

The other figures given, such as fuel, pilotage and harbor charges, etc., we do not question, because we do not regard them as essential. It is, however, worthy of notice that cost of fuel consumption is greater in proportion at lower speeds than upon the open water of the ocean at or near full speed. As to pilot

charges it is perfectly plain that they would be much greater for navigation to and from Father Point and that heavy pilot charges would be incurred in navigating the narrow waters of the river and in navigation of the Great Lakes. These pilot charges would more than offset those of our coast and Gulf ports. The pilot charges at New York are not given separately by the authors and on the St. Lawrence above Montreal and upon the Great Lakes there are none at present, but will be, if the canalization project is carried out, for ocean vessels. At present the pilot charges, Father Point to Montreal, are based on the draft, and for vessels drawing 24 feet would be \$152.88 and for vessels drawing 27 feet, \$171.99.

To carry out their ideas, preconceived for the purpose of canalization propaganda, the authors institute a comparison (on given figures) between the New York-Liverpool route and the St. Lawrence route. The basis on which they proceed is entirely erroneous, although their statistics may be approximately correct. They take the cost and expenses, New York-Liverpool route, upon assumed full cargoes, for the purpose of calculation, and they avoid stating the fact, and, therefore, they do not consider it, that the average full cargo of vessels from New York to Liverpool will be, on other figures given by them as to tonnage draft of ocean vessels in the New York foreign trade, so much greater than the ocean cargoes that can be taken through the canalized St. Lawrence and improved lake channels, that the cost per ton per mile, New York to Liverpool, will be very much less than the cost per ton per mile to lake ports by the St. Lawrence route, when the time of transport and carrying capacity are properly figured. I have followed the authors in taking the New York-Liverpool route, but my general remarks on this subject will apply in different degrees to other Atlantic and Gulf ports. I have not taken into consideration the coastal trade centering in New York, because that trade is of a nature which could not be seriously affected by the proposed St. Lawrence route.

A quite ingenious attempt to get at comparative cost as between the Liverpool-Duluth and Liverpool-New York routes is made by figuring on four trips each year for the Duluth route and two trips each year for the New York route. This is an extremely subtle attempt to prove their contention by evading actual commercial conditions. The harbor of New York has

facilities for navigation and will have ample terminal facilities when present plans are carried out; it has itself most tremendous manufacturing and export industries, and back of it it has great mining and agricultural products, export of the products, however, being to a very considerable extent by way of Philadelphia and Baltimore. These advantages for securing return cargoes from New York will more than offset any comparative mathematical calculation of annual comparative cost of the Duluth and New York routes. The regular course of trade will be to New York and other Atlantic and Gulf ports that may furnish similar advantages for constant employment of ocean-going vessels.

The authors indulge in some quite ingenious figuring on distances as between the Liverpool-Duluth and the Liverpool-New York route. They give these distances in nautical miles, substantially correct. They, however, forget to consider the effect of the difference in distance in connection with the time of passage. Reduced to statute miles, Duluth to Liverpool via Montreal is 4,510 miles and Duluth to Liverpool via New York 4,994 miles, via the Great Lakes and the Erie Barge Canal. These distances are arrived at from authentic data, as follows:

	Miles.
Duluth to Montreal	1,336
Montreal to Liverpool	3,174
Total	<u>4,510</u>

By the Duluth-Liverpool route, via the Great Lakes and the Erie Canal and Hudson River, the authentic distances are:

	Miles.
New York to Liverpool	3,508
Duluth to Buffalo	980
Buffalo to New York	506
Total	<u>4,994</u>

The question then is, "Does the saving of 484 miles mean a saving of time as between the two routes and thus a saving of expense?"

To answer this question accurately requires going into such a number of details, most of which are comparatively small in

amount, and many of which cannot be exactly determined, that I do not propose to follow the juggling process adopted by the authors of the book. A fair result can be obtained, however, by comparing the time necessary to make the voyage from Liverpool to Duluth via Montreal with that via New York. The actual time consumed on each route is nearly identical, as appears from the data given in this paper, but on the New York route the expense of carriage for the distance from Duluth to New York, which would occupy approximately two-fifths of the time, is only about half of the cost for a corresponding time on the Montreal route. Therefore, the expense via the New York route would be at least one-fifth less than via Montreal. In other words, the saving of 484 miles distance in favor of the Montreal route does not mean a saving in expense, but, on the contrary, involves a large loss. We must remember in this connection also that vessels will carry on the ocean to New York much larger tonnage than they can possibly carry on the Great Lakes-St. Lawrence route. This means a very considerable reduction in expense per ton mile between Liverpool and New York; but I do not regard it as necessary to figure out the effect of this, as it is sufficient to know that the expense estimated on a correct basis is so very much larger by the Montreal route, Duluth to Liverpool, than it is via the New York route. This shows the utter lack of argumentative force in the figures and comparisons used by the authors; they juggle statistics, which do not accord with the actual existing conditions. However, the comparison between the two routes selected by the authors for the purpose of their propaganda is unfair and misleading. The comparison is extremely ingenious, but we find when we turn to other trans-Atlantic ports that the distance from New York is less than via Montreal. It is a fact that the farther south vessels go to trans-Atlantic ports from the Gulf of St. Lawrence, the greater the difference in distance in favor of New York. One example of this would seem to be sufficient. The distance from Montreal to Rotterdam via Cabot Strait (the usual route) is 3,540 nautical miles, while the distance to Liverpool is 3,007 nautical miles, the increase being 533 nautical miles. The distance from New York to Rotterdam is 3,322 nautical miles and from New York to Liverpool is 3,036 nautical miles, an increase of only 286 nautical miles. For example, in the case of Rotterdam, from the figures above given it appears that the distance from

New York is actually 218 nautical miles less than the distance from Montreal. An unbiased investigator would have expected more fairness on the part of Ritter and MacElwee.

Dangers and Delays of the St. Lawrence.

In considering the report of the engineers, when I figured distances and time, I proceeded upon the basis of fair weather, no temporary obstacles, no accidents and no delays, and I added to the time required to make the trip by the St. Lawrence route one-third. It is pertinent here to call attention explicitly to some of the causes of delay and to some of the dangers. The St. Lawrence, gulf and river, do not afford navigable facilities that can be regarded as furnishing a basis for any accurate calculation of time required by ocean going vessels, even if the canalization project is carried out. The following statement, as to the difficulties of navigation, is made at page 9 of volume 1, 8th edition of the St. Lawrence Pilot, published by the British Admiralty in 1916:

“The navigation of the Gulf and River St. Lawrence, from the varying tidal streams and currents, the severity of the climate, especially towards the close of the navigable season, and, above all, the frequent fogs, necessitates the exercise of vigilance, prudence and ability.

“In thick weather continuous soundings are necessary for safety, and when near the land the speed should be slow. Vessels navigating the gulf and river should be provided with a sounding machine, by which deep-water soundings may be obtained accurately and frequently.”

Ice.

As to ice, we quote from the above publication, pages 10 and 11, as follows:

“*Ice.*—During spring and autumn the navigation of the gulf is rendered difficult by ice, and navigation is entirely closed during the winter. In spring, generally till May and sometimes early in June, parts of the gulf are usually covered with drift ice, and vessels are sometimes beset in it for many days; if unprepared for meeting ice they often suffer from it and are occasionally lost, but serious accidents from this cause do not frequently occur, as the ice

is then generally more or less in a melting state from the effect of the sun and warmer winds. In autumn, accidents from ice seldom happen, except when winter commences unusually early, or when vessels have lingered imprudently late.

"Cabot strait is never frozen completely over, but vessels not specially built to encounter ice cannot navigate it safely between January and April inclusive, on account of the heavy drift ice which blocks the strait, more especially when the ice forms the Bridge. Sealing steamers attempt the strait at all times, but are occasionally fast in the ice for days together; there is often difficulty in getting through the inner part of the strait. On May 2nd, 1907, the strait was full of pack ice, and there was apparently no passage through.

"*The Bridge*.—Nearly every year, in the spring, or from about the middle of April to the middle of May, there is a great rush of ice out of the gulf, causing a block between St. Paul island and Cape Ray; this block, which sometimes lasts for three weeks and completely prevents the passage of ships, is known as the Bridge. It is recorded that 300 vessels have at one time been detained by this obstacle, and many wrecks have occurred in consequence off the coast of Newfoundland.

"Ice from the gulf is generally met with in Cabot strait early in January; at this time it is thin, but it increases gradually to as much as 4 feet in thickness; occasionally small bergs, some 18 feet in height, are seen, although a large berg is seldom visible; ice may flow through till May, or even till the beginning of June, according to the season.

"A prevalence of north-westerly and northerly winds drives the ice towards the strait and along the west coast of Cape Breton, when incoming vessels meet no ice except south-westward of St. Paul island. A south-westerly gale occasionally takes the ice out between Magdalen islands and Cape Breton island, when it meets the main body flowing past Bird rocks, and closes the strait between St. Paul island and Cape Anguille. Winds between north-east and south open the Newfoundland coast, and the strait often clears quickly with winds between north-west and north-east, so that in about 36 hours very little ice may be visible

from Cape Ray, but quantities of ice pass through for many days after navigation is open, particularly with northerly winds."

These quotations relate in general to the usual course through Cabot Strait.

As to Belle Isle strait, the same publication states (pages 12 and 13) that icebergs commence to arrive in numbers in the straits from the beginning of April until September, or even October, when they are numerous and sometimes very large, being from 150 to 200 feet in height and 500 to 600 feet in breadth. Two hundred bergs and large pieces of ice were counted in the strait one August. It is added that the bergs are a source of danger to shipping "*during the prevalent thick fog.*" It is also stated that after May streams of heavy ice drift in with easterly winds and cause great obstruction. It notes that the first steam vessel enters the strait between the 7th of June and the 25th of July and that the last passes outward between the 11th and 26th of November. In 1889 the first steam vessel passed westward through the straits on the 22d of June and later than this a number of steam vessels attempted to pass through but were compelled, owing to the amount of field ice encountered, to bear up for Cape Race and passed to the southward of Newfoundland.

The publication devotes considerable space to the vigilance, skill and caution needed, giving a great deal of advice. The Admiralty, as appears from the book, recognizing the dangers and delays from ice, has established ice patrols and provides information about ice and concerning derelicts, etc. Among other things as to which information and advice are given, this St. Lawrence Pilot is quite full as to ice on Atlantic routes (page 14), which may be considered here in connection with the actual waters of the St. Lawrence River and Gulf. It states that "One of the chief dangers to which vessels are exposed in crossing the Atlantic lies in the probability of encountering masses of ice, both in the form of bergs and of extensive fields of solid compact ice, released at the breaking up of winter in the Arctic regions, and drifted down by the Labrador current across their direct route, and it is for this reason that more southerly routes have been adopted by trans-Atlantic steamers. Ice is more likely to be encountered in this route between April and August, both months inclusive, than at other times, although icebergs have been seen during all

seasons of the year northward of the parallel of 43 degrees N., but not often so far south after August. In March, 1913, icebergs were reported in lat. 42° 57' N. long. 49° 15' W."

The Pilot is full of information about ice and states (page 16) that many of the Canadian steamers take the north route on account of the short distance, their navigators expecting ice and preparing for it, and it gives the case of the Royal Edward, which in 1914 struck a berg in a dense fog about 100 miles east of Cape Race. The Pilot also, in giving the terminology of ice terms described (pages 17 and 18) thirteen different kinds of ice, from pack ice and bergs to brash or sludge ice.

When it is remembered that ice conditions, as described above, except as to icebergs, extend not only through the straits, but through the entire gulf and the lower St. Lawrence, it is impossible to avoid the conclusion at which the insurance companies have arrived that navigation to and beyond Father Point from the ocean is extraordinarily dangerous; and it is also impossible to avoid the conclusion that vessels navigating those waters are liable to disaster and delays from ice far greater than in any other portion of the Atlantic, except in polar and sub-polar regions.

Fog and Snow.

Another cause of great delays from necessary slowing down of speed, and a cause of extreme danger, is fog. I can do no better than to again quote from the Pilot. On pages 18 and 20 these statements are made:

"Fogs occur in the gulf and river during the open or navigable season, and sometimes last several days continuously; they are most frequent in the early part of summer, and seldom fail to accompany an easterly wind of any strength or duration. In October and November, the fogs and rain previously attending easterly gales are replaced by thick snow.

"Moderate and partial fine weather winds occur without fog in any season and in any locality. In the early part of the navigable season, especially in April and May, north-easterly winds with clear weather are frequent, and they also occur *occasionally* at other seasons, in every part of the gulf and river.

"Fogs in easterly gales extend high above the sea, and

cannot be seen over from a vessel's masthead; at times the land or other objects may be distinguished at the distance of half a mile or more in day time. Fogs in calms, especially after strong winds, are frequently so dense as to conceal a vessel within hail, but usually they are not of much height, so that objects at a distance of 50 yards obscured from a person on deck can be seen by a person some 50 feet up the rigging.

"When land is visible in foggy weather, estimations of distance are usually in excess of the correct distance. No reliance should be placed upon a position assumed from the distance at which the sound of surf breaking on a rocky shore was heard, but where steep cliffs extend to the sea, the proximity of a steam vessel to them may be detected by the echo of the whistle, although this cannot be trusted. The only safe guide is the constant use of the lead."

At pages 133 and 134 the following statement is made with regard to fog conditions in Belle Isle strait:

"*Fogs*.—During summer, dense fogs prevail all over the strait, and sometimes last for several days at a time. Thick fogs are equally prevalent with either direction of the wind. With westerly winds, the fog commences to the westward and rolls gradually along the Labrador side, frequently extending only a short distance from that coast, so that by keeping over towards the Newfoundland side the fog may often be avoided.

"With easterly winds, the fog is more general on both sides of the strait. The Newfoundland side almost invariably clears first. These fogs cling closely to the water and the shore line; from a vessel's masthead the summits of the Labrador hills may sometimes, though rarely, be seen over them.

"During a period of 40 days in July and August, when simultaneous observations were made on both sides of the strait, fogs, mist, &c., occurred on 60 per cent. of the days on the Labrador side, and on 40 per cent. on the Newfoundland side."

Further we find in the Pilot, page 20, that "easterly winds prevail in the spring and frequently blow for several weeks in succession." And, as already quoted, fogs "seldom fail to accompany an easterly wind of any strength or duration."

Gales.

The condition of navigation on the gulf and river, as affected by gales, is not, so far as mere strength of the wind is concerned, of material importance, but when taken in connection with ice, fog, cross currents, shoals and the proximity of land, conditions existing in the St. Lawrence, gulf and river, strong winds and heavy gales become much more serious than when they occur on the open ocean, because they greatly increase navigation dangers caused by the other menacing elements mentioned. The Pilot gives a description of the usual gales at page 21, in the following language:

"Gales.—It is unusual for a very heavy gale to occur in the Gulf and River St. Lawrence from May to October, although fresh to strong breezes are common. There are, however, years the character of which is decidedly stormy; gales of wind of considerable strength then follow each other in quick succession and from opposite quarters. Also during August and September cyclonic storms, which originate as hurricanes in the West Indies, pass over the Eastern Maritime provinces, and are severely felt certainly westward to Ontario."

Currents.

The direction and changing of currents in the gulf and lower St. Lawrence is so varied at different places and at different times that it is impossible in this paper to consider each location. One quotation from the Pilot (page 25) is sufficient to give a quite clear idea of general current conditions.

"Gulf of St. Lawrence.—The rate of the current in most of the open area of the Gulf of St. Lawrence seldom exceeds one mile an hour; its direction, therefore, is very variable, being easily influenced by strong winds, and on this account it is necessary to exercise caution in navigation."

As to tidal streams, we find the following statement (page 28):

"Tidal Streams.—Throughout the gulf the currents are affected by the tidal streams, being accelerated when the stream is running in the same direction as the current, and retarded, or even reversed, when the stream is opposing the current. The direction of a current, also, may turn with more or less regularity in accordance with the tidal stream.

"The rate of the tidal stream in the lower St. Lawrence is sometimes five to six knots."

In particularizing as to the lower St. Lawrence, the information given in the Pilot, pages 29 and 30, shows distinctly that the currents in tidal streams occasion great variation in the direction and force of the river currents.

Wrecks.

The frequency of wrecks, and great danger to navigation, has necessitated adoption by the British Admiralty of a system of marking them by vessels painted green with white inscription and moored, when possible, near the side of the wreck next to mid-channel. (See Pilot, pages 33-34.)

From what has been said, it must be apparent to any mind not confused by figures and diagrams that the St. Lawrence route is an extremely dangerous one and that it cannot be pursued with the same freedom and speed that obtain upon the open seas. From this it follows that vessels will not undertake that navigation in about 1,400 miles of canal, river, dredged channel to Montreal with the navigation of the canals, narrow channels and lakes, above Montreal, added, unless they can obtain a freight rate high enough to warrant them in doing so. Those rates would certainly be too high to permit competition with the Great Lakes, Erie Canal, Hudson River, New York route.

These considerations fully verify the great danger and the great necessity for caution and careful pilotage, as well as the necessity of proceeding many times with slackened speed, especially where ice or fog conditions exist and in view of the numerous islands and the proximity of the river shores.

It also follows that the addition which we have made in considering the engineers' report of one-third of the time required on the canalized St. Lawrence is, if anything, too small.

COST OF TRANSPORTATION

Continuing the juggling of figures in estimating the costs and profits of ocean going vessels, Duluth to Liverpool, via Montreal, the authors arrive at a profit of \$6 per ton for 7,500-ton cargo vessels. This is plainly guess work, because it is based on the proposition that there will be part cargoes of grain Duluth to Lake Erie ports, the lading being filled out by what the authors call high class freight, the west cargo being taken at one-third capacity. It is plain that this is all guess work and that there

is no bottom to it, unless ocean vessels can successfully compete with the Lake-Canal-New York route. In fact it entirely begs the question to be determined.

Again, the authors figure the cost per bushel to the 7,500 tons cargo ocean vessel, New York to Liverpool, at 12 5/10 cents, and Duluth to Liverpool via Montreal, at 16 4/10 cents, the difference in favor of the New York route being 3 9/10 cents, and from this they conclude that grain must be carried from Duluth to New York at 3 9/10 cents per bushel to compete with the St. Lawrence route. All this is based on intricate figures of cost and time, which are purely theoretical and not at all reliable, and which in most instances are utterly wrong. Beyond this, the figures the authors take are the abnormally high ones of the world conditions of commerce created by the war. The only rational basis to proceed upon is that of the actual rates charged under normal conditions; the existing cost taken by the authors cannot furnish any basis whatever for the actual cost which will exist when commerce and business have returned to normal conditions, namely, those existing prior to the war. This is entirely fair, because in giving rates (not costs) I make no allowance for the reduced cost on the canal occasioned by the completion of the thousand ton barge improvement. The actual rates in 1914, on wheat, Duluth to New York, averaged 5.82 cents, and from New York to Liverpool the average rates were 3 cents, making the rate, Duluth to Liverpool, via New York, the lakes and canal, 8.82 cents, that is the actual normal carrying charge, and gives what it would cost the shipper. I do not consider insurance here, because the tremendous increase, Montreal to Liverpool, over New York to Liverpool, will make the cost greater by far on that route, when insurance Montreal to Duluth is added (or even without this addition) than the entire insurance, Duluth to Buffalo, Buffalo to New York, New York to Liverpool. I would call attention here to the fact that the average rate on wheat in 1914 from Montreal to Liverpool was 3.93 cents per bushel as against 3 cents from New York. The actual charges for carriage which must be assumed to leave fair profits to the carrier over cost, under normal conditions, absolutely falsify the theoretic figure juggling of Ritter-MacElwee. Those juggled figures make the cost, New York to Liverpool, actually four times the rate charged during normal times. Their theoretical figures also show that the cost from Duluth to Liverpool via Montreal

is double the normal rate charged from Duluth to Liverpool via New York, for the average rate in normal times by the New York route, Duluth to Liverpool, is 8.82 cents per bushel and they figure the cost Duluth to Liverpool by the Montreal route at 16.4 cents. These costs show the absolute absurdity of the authors' calculation when used for the purpose of determining what the cost will be to the shipper by the different routes when business and commerce have come to normal.

There is another consideration which Ritter-MacElwee have evidently not had in mind, cost and rate on the ocean depend largely upon capacity, and carriage by ocean New York to Liverpool will be by vessels very much larger than those used for their purposes by the authors and consequently at much less cost per ton. Also west bound cargoes to New York will average much nearer full capacity than the one-third assumed by the authors for their typical Liverpool-Duluth trip via Montreal.

Another absurdity that the authors indulge in is their attempt to figure out cost on delay in port; they endeavor to minimize the delay for the Duluth-Montreal route as against delay by the Duluth-Buffalo route. They either are ignorant or wilfully conceal the fact that ocean going vessels are necessarily so constructed that the time for loading and unloading, as compared with lake vessels, is excessive; ocean going vessels, in order to preserve strength, have comparatively few hatches and also have bulkheads, while our large lake vessels have thirty cargo hatches and over and clear holds. A lake vessel can be loaded with grain and the cargo trimmed in four or five hours, and she can be unloaded in the same time. This is so much less than an ocean vessel would require, that the cost of delay in port for these purposes to the latter would be two or three times that of the lake vessel. This does not take into consideration the other causes of delay to the ocean vessel, which must be outfitted for ocean service before each voyage.

The attempt of the authors to draw distinction between the grain business on the lakes and the carriage of high class freight is not accompanied by at all satisfactory results, because it is based upon the idea that manufactured products of the territory tributary to Lake Erie can be carried via Montreal to eastern ports across the Atlantic in competition with the present water route. This is not true as matter of fact. The demand from Europe for our manufactured products can be supplied more

cheaply by rail and ocean from the manufacturing districts tributary to the Atlantic and gulf ports than it ever could be from lake ports by ocean vessels. Again, lake vessels and canal barges can be very readily adapted to the cheap carriage of manufactured products from Lake Erie ports by lake and canal to New York. We have already shown that this can be done at rates with which the Montreal ocean route cannot compete.

In discussing insurance rates the authors refer to testimony presented at a hearing before the Commission in New York and from that deduce a difference in favor of the New York route of only $2\frac{1}{2}$ cents. They seem willing to accept the loose testimony given at that hearing; we have given the actual figures obtained from reliable insurance agents who know what the rates are and they are as follows, from Montreal:

From the opening of navigation to October 15, $27\frac{1}{2}$ cents per hundred; October 15 to October 31, $32\frac{1}{2}$ cents; November 1 to November 15, $42\frac{1}{2}$ cents; November 15 to November 25, 55 cents, the rate from New York being $\frac{1}{8}$ per cent or $12\frac{1}{2}$ cents per hundred all the year round. The difference in rates, therefore, is not $2\frac{1}{2}$ cents during the greater part of the navigation period, but 15 cents, increasing to a difference of $42\frac{1}{2}$ cents at about the close of navigation. The authors' treatment of insurance rates is therefore not only utterly wrong, but evidently intentionally deceptive, because on inquiry of those engaged in the insurance business they could have ascertained the actual facts.

The authors have also juggled other figures in regard to costs. Their figures as to the cost of construction of lake vessels are way beyond even imaginary amounts. They are evidently based on extravagant Shipping Board war figures. The average cost of the modern Great Lakes' freighter to its owner is thirty-five to forty dollars per ton carrying capacity, or, for a 10,000-ton vessel, \$350,000 to \$400,000 instead of the \$1,100,000 given by Ritter-MacElwee. In this connection the authors give comparisons between carriage to Montreal by the *Anacortes* and the cost by a lake freighter from Cleveland. It is noticeable that it took the *Anacortes* five days, Cleveland to Montreal, a distance of about 530 miles. Perhaps this has some bearing on the authors' computation of time required in navigation of the Great Lakes by a vessel fitted for ocean traffic! It is also noticeable that the cost of operating the lake freighter, Cleveland to Montreal, is less than one-third of the cost of operating the *Anacortes*.

Perhaps this also has some bearing on the authors' estimate of carriage by ocean vessels on the Lakes-St. Lawrence route! We would also call attention to the fact that the time required for the ocean vessel to make the trip from Cleveland to Montreal, namely, five days, corresponds exactly with the time I have figured above after I added one-third for delays; my figures are 120 hours, precisely five days, the time it took the *Anacortes* to make the trip. The authors then figure the port charge at Montreal on transshipment and run the entire costs of the trip and charges by lake freighter up to \$12,483.33. They have thus successfully proved that the cost of carriage to Montreal and transshipment there is too expensive to be considered, and it follows that with the low cost of transshipment at Buffalo, and the fact that Barge canal boats can deliver directly to the vessel at New York, the Lake, Canal, New York route is the cheapest. Further than this, as Barge canal boats can take freight direct from Detroit and Lake Erie ports to New York city, there would be no transfer charges and no delays at Buffalo for freight so carried. These last figures of the authors result in a *reductio ad absurdum* and prove that those who indulge in theories based merely on figures, when endeavoring to solve the large questions of commerce, unavoidably enter a labyrinth which brings them rarely to the true exit.

As evidence of the futility of the use of mere figures and statistics to solve economic problems, I would again call attention to the fact that the course pursued by the authors (found at pages 69 et seq.) results in the remarkable proposition that grain must be carried from Duluth to New York for less than 3 9/10 cents per bushel in order to put it upon a par with the small capacity vessels crossing the Atlantic and proceeding up the dangerous, tortuous St. Lawrence gulf and river and the Great Lakes and their connecting channels to Duluth. If Ritter-MacElwee had been inclined to be fair they would have given the other side of the story. Upon the figures given by the writers of the book, the cargo tonnage cost of carriage by their limited capacity vessels, Duluth to Liverpool and return is \$5.42, based on full cargoes both ways, but they figure the profits on 4,500 tons of grain from the upper lakes and 3,000 tons of general cargo from Lake Erie ports, reducing the whole to grain "for purposes of comparison," that is they figure on 7,500 tons of grain each way. As the cost they give is \$5.42 per ton for round trip, with full cargoes, the

cost per ton on the east-bound trip would be \$2.71 per ton. Under normal conditions the cost of cargo by lake vessels on 10,000 tons, Duluth to Buffalo, would not exceed 7/10 of a mill per ton mile for the 980 miles, and the cost, under similar conditions, of carriage on the Barge canal would not exceed 8/10 of a mill per ton mile for the 506 miles, Buffalo to New York. In making their figures Ritter-MacElwee are compelled, in order to take care of navigation problems, to base their cost figures on vessels carrying only 7,500 tons, and when we consider the much greater capacity of vessels engaged in the trans-Atlantic grain commerce centering in New York, it is apparent that the cost per ton, Liverpool to New York, will be very much less than that in the case of the 7,500 ton cargo vessels. In normal times the rate, New York to Liverpool, is three cents a bushel, or \$1 per ton. I adopt this as the cost in the absence of figures at hand giving the actual cost; \$1 a ton being the rate, is undoubtedly very considerably greater than the actual cost.

On this basis the following table will show the comparative cost for 10,000-ton vessels, including delays and overhead, on the route by the different classes of carriers, Duluth to Liverpool, via New York, under normal conditions:

Duluth to Buffalo, 980 miles, at 7/10 of a mill.....	\$6,860
Buffalo to New York, 506 miles, at 9/10 of a mill per mile	4,048
New York to Liverpool, at \$1 per ton.....	10,000
Total	\$20,908

This makes the cost per ton on the New York route \$2.09 or 62 cents a ton less than by the limited capacity vessels navigating the St. Lawrence route on Ritter-MacElwee's figures. But their computation is not correct; adding to the running time between Liverpool and Duluth via Montreal as I have given it above, only two days for delay in port, and 12½ hours for delay necessarily caused by insufficient depth of the 25-ft. channel for vessels drawing 24 feet 2 inches and adopting the per diem cost asserted by the authors, the cost per ton is \$3.71 instead of \$2.71.

I would also call attention to one of the elements the writers do not give due consideration to, and that is time. Time occupied in transit is the prime element of cost per ton. They adopt

a speed which is not at all attainable for their limited tonnage capacity vessels, as I have shown heretofore, and in addition to this, they figure on the vessel drawing 24 feet 2 inches in 25-ft. channels from Lake Erie to Montreal. No vessel propelled by steam can with safety, or at all, make even four miles an hour drawing 24 feet of water, with only ten inches under her keel. The writers assume things as the basis of their figures of cost to the vessel that are not at all correct and it follows that their calculations, based on the time they give, are wholly imaginary. Figuring on a vessel drawing 24 feet 2 inches from Lake Erie to Montreal with 25-ft. depth in the improved channels, we can readily make a table which shows the utter unreliability of the cost figures given by Ritter-MacElwee, as follows:

Total length of 25 foot channels, 95 miles to Lake Erie, at not over three miles an hour, 32 hours.

Total length improved channel over 25 feet deep, average 8 miles an hour, 272 miles to Lake Erie, 34 hours.

Montreal to the ocean, 10 miles an hour, 1,000 miles, total 100 hours.

Liverpool to the Gulf of St. Lawrence, at 12 miles an hour, 2,000 miles; total time 167 hours.

It would therefore take the limited tonnage vessel 13 days and 21 hours for the trip, one way, to Lake Erie, not considering the 1 day's delay for lockage and other delays on account of the unusual conditions existing on the gulf and lower St. Lawrence. To this must be added the time from the southerly terminus of the Welland canal to Duluth with a partial cargo and at an average speed of 10 miles an hour, requiring 4 days for transit and $1\frac{1}{2}$ hours for lockage. Adding these times together for the different portions of the route we find that from Duluth to Liverpool a vessel drawing 24 feet 2 inches from Lake Erie ports would require by the St. Lawrence route 18 days, $221\frac{1}{2}$ hours. By the Great Lakes, canal and Hudson River route to Liverpool, the time required is, Duluth to Buffalo, 96 hours; Buffalo to New York, 5 days; New York to Liverpool, the average time made as between tramp and fast steamers, both of which carry grain, should be at least 15 miles an hour, or 9 days, 17 hours. The total time via the New York route would, therefore, be, on the average, 18 days and 17 hours, or $51\frac{1}{2}$ hours less than by the St. Lawrence route. It is of course impossible with the

figures I have at hand to average accurately the amount of grain carried by fast steamers and the amount carried by those making only 12 miles an hour, but the average adopted fairly shows that there must be a small difference in time in favor of the New York route; at least, that the time will not exceed that of the St. Lawrence route.

The authors wind up chapter 7 with the remarkable italicized statement that "the study shows that the additional cost of operating ocean vessels to lake ports, as compared with Atlantic ports, is only a fraction of what may be saved through the elimination of rail hauls and transfer charges." I most humbly beg the pardon of the authors for stating, as I do, that "the study shows" no such thing.

Chapter 8.

This chapter is devoted to showing that the area commercially tributary to the Great Lakes-St. Lawrence Waterway has a great population, and attempts to make a comparison between the Great Lakes territory and that on the Baltic and on the Mediterranean seas. This seems rather ridiculous, because those seas are reached by short, deep and wide water connections with the ocean, whereas the problem here is whether the territory of the Great Lakes can be reached with commercial success from the ocean through comparatively narrow, natural waterways, artificial canals and long artificial channels on the river and between the lakes, extending from Father Point to, say, Duluth or Chicago, a distance of about 2,000 miles, including approximately 800 miles of the deeper, wide expanses of the lakes. This chapter is also prophetic, for the authors say, "on some commodities the saving will amount to as much as \$10 per ton, as compared with the cost by way of existing routes." How can this be if ocean vessels cannot use with commercial success the St. Lawrence-Great Lakes route at freight rates that will care for the commodities referred to and make the estimated, or any saving? The authors are entitled to credit for having collected and included in this chapter a great mass of information which is valuable for reference, but not very valuable for the purpose of determining the questions which the International Joint Commission had before it.

Chapter 9.

This chapter is valuable also for the amount of material bearing on the productive capacity of 16 states. The statement of the

authors that "the conditions with respect to economic procurement of materials are such that with adequate transportation facilities there will be a more pronounced development in the future" in the territory considered is undoubtedly true, but it does not go very far to determine whether the St. Lawrence-Great Lakes route will be a success.

Chapter 10.

This is an interesting collection of historical facts, but not at all helpful in the direction of solving the important question whether it will pay to canalize the St. Lawrence. I would call attention to the fact here that the depths of harbors, connecting waters of the Great Lakes and lock dimensions will not, on the 25-foot plans, accommodate ocean vessels capable of carrying cargoes at all comparative with the cargo capacity of lake vessels which are built upon a very different model from that of those that navigate the ocean. In my discussion heretofore I have taken 30-foot depths as absolutely needed to accommodate ocean vessels drawing 27 feet loaded, for the reason that the cargoes of such vessels will approach the cargo capacity of lake vessels and the carrying capacity of the Erie Barge canal, although they will be less than that of lake vessels.

Chapter 11.

This also is an interesting chapter devoted to the benefits of navigation improvement on the Great Lakes. Just what this has to do with the question under consideration it is impossible to see. That deepening the shallow channels on the Great Lakes system and deepening the harbor facilities will tend to lower the cost of transportation on the Great Lakes by ocean vessels is undoubtedly true, but it will also greatly reduce the cost of transportation by lake vessels and make the Lake-Canal route still cheaper, extinguishing the chances of competition with lake vessels.

Chapter 12.

This is devoted to a comparison of navigation facilities on the Great Lakes with those of ocean ports. It does not throw any light on the question of canalizing the St. Lawrence and improving the Great Lakes system to accommodate ocean vessels, but it does tend to show that the facilities of the ocean ports

need improving and reinforces the argument that the expenditure of hundreds of millions on the St. Lawrence route will be a direct obstacle to proper improvement of ocean port facilities.

It is a fact mathematically ascertained that the modern large lake vessels will carry 85 tons for each increased inch of draft. As the largest lake vessels will carry ten to twelve thousand tons on about 20 foot draft, it follows that in case the shallow lake channels and lake harbors are deepened to 25 feet, accommodating lake vessels drawing 23 feet, their tonnage would be increased by 3,060. If the lakes' shallow waters were increased to a depth of 30 feet (the plan upon which the St. Lawrence canalization should proceed to offer competition between ocean and lake vessels under present conditions) the large modern lake vessels could be adapted to an additional draft of 8 feet, giving an additional tonnage of 8,160 or a total tonnage of seventeen to twenty thousand. With an increased draft of 8 feet, the beam of lake vessels would have to be also increased to some extent and this would materially increase the tonnage capacity. In these calculations I have figured on two feet of water below the vessel's bottom, as that is recognized on the lakes as ample depth for cheap cost of transportation.

Messrs. Ritter-MacElwee in their confusion of statistics fail to recognize these elements, so important in determining whether navigation by ocean vessels on the St. Lawrence and Great Lakes can be successfully carried on in competition with the present route. Their very great importance becomes apparent when we consider that with the increase in draft of lake vessels, as stated above, the cost of carriage per ton mile would be cut down to a figure at which the very much smaller tonnage ocean going vessels would find competition on the lakes impossible and which would make the Lakes-Canal and Hudson River route so much cheaper than the Lakes-St. Lawrence route that there would be no chance for competition between the two. The operating cost of lake vessels with the increased cargo capacity would be only slightly greater than at present and cost of carriage would be cheapened accordingly.

Chapter 13.

This chapter is devoted to the character of navigation on the St. Lawrence. It is based on a total delay of about twelve hours and a half. This is an extremely inaccurate basis and shows lack of study of the subject with a knowledge of the real

facts. The conclusion arrived at from the false assumption is that the time of the voyage will be equivalent to a practical lengthening of the ocean voyage by 120 miles; of course this is correct if there is a delay of only $12\frac{1}{2}$ hours, but the premise being incorrect, the conclusion is also. The authors also make an extremely inappropriate comparison with the Suez and other short canals connecting great oceans and saving thousands of miles of ocean navigation. Such a comparison is simply ridiculous. They also compare with the Manchester canal and the Amsterdam canal, both comparatively short and both constructed and used on account of the absolute necessity of restraining excessive railroad charges. Those canals serve special purposes and conditions of commerce which are not at all those of the Great Lakes-St. Lawrence route.

Chapter 14.

This chapter is devoted to "Comparison of the St. Lawrence with other Ocean Routes." It is not of any importance so far as the questions being considered are involved and I should not take notice of it were it not that the authors make the extraordinary statement that "The St. Lawrence Ship canal will afford greater opportunities than the Manchester and Kiel canals." Why the authors should indulge in such a statement can only be explained by their anxiety to do what they possibly could in support of the St. Lawrence scheme. It is only necessary to call attention to the fact that the Kiel canal is comparatively short and connects wide and deep waters, saving a great deal of distance and considerable difficult navigation through the Cattegat and Skagerrack, while the Manchester canal was constructed to connect one of the greatest manufacturing centers in Great Britain, Manchester, directly with the ocean, to avoid the excessive railroad charges from Liverpool to that city, which was handicapping its industries. The canal is only thirty-nine miles long and is used by ocean going vessels trading with Manchester and charging rates that have been found low enough to compel reduction in railroad rates. It is ridiculous to compare these canals with the 1,400 miles channel from the ocean to Lake Erie and the additional thousand-mile channel to Duluth and Chicago, a channel which on the gulf is subject to extraordinary dangers and delays and on the river passes through many miles of comparatively narrow channels, not over thirty feet

deep, before reaching Montreal, and from there will pass through narrow and tortuous channels, as well as canals, before reaching Lake Ontario, and then through a canal twenty-five miles long, and up the lakes through comparatively shallow and narrow waters, except in the deeper waters of the lakes proper; a more preposterous comparison cannot be imagined.

Chapter 15.

This chapter is devoted to navigation conditions of the St. Lawrence route. The authors seem to have picked out what suited their purposes from observations by the United States Hydrographic office and the United States Weather Bureau. I have not examined those records because the exact data given by the British Admiralty are much more reliable and go much farther into details, as would be expected, inasmuch as the conditions arise in British waters and the observations and investigations were carefully made for the use of navigators. I have given in detail the statements of the British Admiralty office as to the actual conditions existing and therefore need say nothing further than to remark that the authors should have credit for their ingenuity in preparing chapter 15. However, they make the following statement, which is entirely foreign to the subject which was before the International Joint Commission: "Compared with the route from the St. Lawrence to Europe, the Northern Pacific routes involve a much greater distance in areas of great fog frequency during the greater part of the navigation season." What this has to do with the conditions on the North Atlantic, when we investigate the delays and dangers arising from fog as between different ocean routes, is extremely puzzling. What the authors say about fog frequency in the North Atlantic ocean is irrelevant when tested by the statements of the British Admiralty Pilot and when taken in connection with the other extraordinary dangers of navigation in the Gulf of St. Lawrence and the lower river.

Chapter 16.

This chapter is devoted to the depths required for the "accommodation" of vessels engaged in the maritime trade. Just what the authors mean by "accommodation" of vessels engaged in maritime trade is not quite understandable. The problems we have to solve here are not what channels will accommodate vessels engaged in maritime trade, but what vessels engaged

in that trade require for safety, the saving of time and expense and the earning of profits. However, as the chapter seems to relate to port depths it is well to note that at all the ports in the United States frequented by any considerable tonnage, the depths are not less than thirty feet and in the principal ones they are forty feet. The same thing is true of British ports. As to the table of other foreign port depths we find that in great world commerce ports the same condition exists, that is at the great world commerce ports available depths are not less than thirty feet and two of them in the far east reach forty-four to forty-five feet. I would call attention to the fact that the figures given under the heading "other foreign ports" are apparently unreliable, because vessels trading to many of those ports have drafts which the depths given by the authors would not accommodate.

Ritter and MacElwee devote considerable space in this chapter in an endeavor to show that ocean vessels of "large capacity are practical on a small draft." Among other things, they insert a letter to Mr. Harriman which is to the effect that ocean going vessels "to ply on the Great Lakes" with 8,000 tons D.W.T., 7,000 tons cargo capacity, can be designed. This is foreign to the problems before the Commission. The fact is undoubtedly true, but the question is, can such vessels engage in the ocean, St. Lawrence and Lake commerce profitably? As appears from the facts I have given above, this cannot be done.

It is somewhat amusing to read that portion of this chapter in which the authors quote from Mr. Kirkaldy's statement in regard to the change of character of steamships to accommodate them to the use of the Suez canal. This is done for the purpose of showing that there will be a change in the design of ocean steamships so that they can navigate the St. Lawrence as proposed to be improved and the Great Lakes. The conditions are entirely different. The Suez canal and the Red sea so greatly shorten the distance between the far east and the Atlantic, as against the only other routes existing before the Panama canal was constructed, that a change in the design of steamships that could profitably navigate the canal and the Red sea was an absolute necessity to save British commerce, as Mr. Kirkaldy states. British commerce is not endangered by improvement of the St. Lawrence. The entire argument seems to lead to the conclusion that it will be necessary to construct vessels of a special type and of small cargo capacity as compared with the cargo capacity

of vessels now navigating the Atlantic ocean; it is an admission which I hardly expected.

The authors evidently recognize the weakness of their entire argument, because they devote several paragraphs to persuading the Commission that "deep draft vessels are not essential for the St. Lawrence waterway." No one claims that deep draft vessels are essential to the St. Lawrence waterway, even canoes could navigate them, but in order to make the use of the St. Lawrence route profitable the waterways must be as free from danger, of such capacity and as little difficult of navigation as possible, in order that vessels of large capacity may navigate them. Surely this is true when such ocean vessels will have to meet the competition of the cheap and safe lake, canal, Hudson river and ocean route; it is certainly true when we consider that ocean vessels of large cargo capacity can make far greater profits by confining their activities to trade with our great Atlantic coast ports than any small capacity vessel could make over the other route. Under these circumstances, the statement made by the authors that "It is then fairly conceivable that in addition to the steamers that may navigate the Great Lakes, just as they are, the commerce of that enormous region will be of such a volume that new types of vessels, probably of the Diesel system, will be built especially for this trade" becomes humorous, for they have to resort to "conceivable" results and have to expand the region affected by describing it as "enormous" and assume that the volume of the trade from that "enormous" region will be such that new types of vessels may possibly be constructed. Our authors throughout the book seem to rely upon the juggling of figures which suit their purposes, but here they must be given credit for enlargement of their imaginative faculties.

The entire chapter is an exposé of the weakness of the proposed improvement, but it proves quite conclusively that to give the slightest hope of the use of the proposed route ocean going vessels must be given the largest practicable capacity and that to do this a depth of thirty feet is essential.

Chapter 17.

This chapter is devoted to the types and sizes of vessels which carry the world's commerce. The course pursued by the authors is extremely ingenious because it is devoted to the entire commerce of the world including comparatively shallow waters, as

well as deep, and it is not, as it should be, confined to the draft and capacity of vessels engaged in foreign commerce and entering the principal harbors of the United States; nor is it directed to the ability of deep draft vessels to navigate the Great Lakes and the proposed St. Lawrence channels profitably in competition with rail and water routes. This last is the question to be solved. However, taking the figures given by the authors in the case of the Port of New York, 1918, we find that 1,598 vessels drawing more water than the authors argue vessels navigating the St. Lawrence and Great Lakes channels would draw, and making 2,395 trips, entered and cleared. Why the authors take the year of 1918, instead of resorting to normal conditions prior to the war, I do not understand, but it is sufficient to say that taking those figures they show very plainly that the expense of carriage to New York would be proportionately very greatly less than that of the lighter draft vessels that Ritter-MacElwee rely upon to use the St. Lawrence and the Great Lakes.

The authors also use other figures relating to ports having harbors that need improvement to enable them to accommodate vessels of deeper draft than they now do. This only shows that my previous statement that the carrying out of the St. Lawrence canal project and the expenditure of the money necessary therefor would, if successful, have a direct tendency to almost extinguish needed appropriations for rivers and harbors improvement, is entirely correct.

Chapter 18.

This chapter is devoted to a study of vessels passing through the Panama canal in the years 1919-1920. The authors devote a great deal of industry to a study of this problem, but the results are useless for any purpose connected with the questions under consideration, because the figures show distinctly that the great bulk of the grain trade from Pacific coast points is carried on in vessels which considerably exceed in draft and capacity the smaller vessels on which the authors base their argument that the St. Lawrence-Great Lakes channels would be used by vessels of comparatively light ocean going draft (page 226). Of the 120 vessels carrying grain from Pacific coast points, 105 drew from 28 to 23 feet and only 15 less. Of the 27 vessels which the authors state were destined for Trans-Atlantic ports, all but 9 drew 23 feet and over. The same general consideration

applies to the figures given as to lumber; those relating to the carrying of nitrates are subject to the same remarks, in general. It is to be noted that the great mass of this commerce consists of our coast trade and has nothing to do with the trade of the nature that it is claimed will go through the Great Lakes-St. Lawrence projected channel.

In addition to this the authors lose sight entirely of the fact that the Panama canal saves several thousand miles in the voyage from Pacific coasts to our gulf and Atlantic coasts and to Trans-Atlantic ports, a condition which does not exist when we compare the time required by the Great Lakes-St. Lawrence route and that required by the Great Lakes, Canal and New York route. The other figures used in this chapter, if reliable, are of no help whatever in coming to a decision upon the problems before us.

Chapter 19.

This chapter was written to show that ocean vessels will seek inland ports. As the subject has been quite fully covered by a paper prepared for the New York State Waterways Association, published with this report of the State Commission by Mr. George Clinton, Jr., I will confine my criticism to a very few considerations.

Vessels do not "seek" inland nor do they "seek" coastal ports, merely on account of their location. The operation of vessels involves a very simple business proposition; they will seek those ports to and from which they can trade with the most profit to themselves, they will not seek routes for the benefit of particular regions, people or ports; they are built to navigate and make money, and the business they will engage in, the routes they will follow and the ports they will go to will be those which furnish business and the best profits they are capable of earning. Another proposition is self evident, vessels will not be built of particular types for the purpose of accommodating particular ports, people or regions; they will be built of those types which will have the greatest earning capacity in view of the trade they can engage in and the ports they can seek. It is all nonsense to say that vessels "seek" inland ports.

In considering the distances which vessels go from the ocean, we have but to look at the table given by the writers (page 234) of 15 illustrations; 11 vary from 18 miles inland to 113 and in

each instance the reasons for the navigation by ocean vessels of the distances in these cases are purely local and, like the Manchester canal, they are cases where transfers of cargo can be avoided by the vessel proceeding for a comparatively short distance inland and at very little loss of time. The four remaining instances we may consider separately.

First, the Yangtze-kiang and the port of Hankow, 615 miles from the ocean. The Hankow trade by ocean vessels is negligible, it being only about 6,000,000 tons in 1913, including steam and sailing vessels, the trans-ocean steam vessels engaged in the trade being a comparatively small proportion as compared with the river and coastal steamers. Although it is a wide and comparatively deep river up to Hankow, the foreign ocean trade is so small that few trans-ocean vessels go there. The truth is that Shanghai, a short distance up a tributary of the Yangtze estuary (really part of the sea) takes nearly all of the foreign trade. If ocean going vessels sought inland ports their trade to Hankow would certainly be very great, comparatively, because there is plenty of water for navigation in width and depth and there are a multitude of places for securing the immense production of the tributary agricultural, mining and industrial regions.

Second, the Amazon to Manaos, 900 miles from the sea. The authors by their own figures, make the assertion that vessels "seek inland ports," ridiculous. There are quite a number of ports between Manaos and the port of Para, the real ocean port, to support the small steamers on the lines paraded by the authors. None of those steamers exceed in capacity the barges that can profitably navigate the Erie canal. The truth is that the ocean vessels mentioned by Ritter-MacElwee are of very small ocean capacity (about 2,000 tons) and could not afford to engage in the trade at all if it were not for the fact that the east-bound cargoes are composed almost wholly of rubber which is in such demand in the world that it will bear compensatory freight charges which the ordinary cargo of commerce will not.

Third, the St. Lawrence to Montreal, 1,003 miles; here we also have a special condition. The waters of the gulf and river have sufficient width and depth to accommodate vessels of large capacity and the commerce conditions are peculiar, because the great bulk of the trade represents almost the entire export of Canadian products with the exception of the Pacific trade. The national element enters here; the trade is built up in the interest

of Canada. It is to be noted that that trade is but a very small proportion of the entire world trade with the Atlantic and Gulf ports.

Fourth, the Amazon to Iquitos, 2,200 miles; the Amazon to that port is a wide and deep navigable stream and it penetrates to the heart of the rubber industry. Relying upon the statement of the authors that vessels seek inland ports, there is no reason why the 13 steamers of the Booth line, the 9 steamers of the Red Cross line, the 7 steamers of the Lloyd-Brazilian line and the 2 steamers of the Italian line should not proceed up the river to that port and thus save transfers from the small river craft which use the river from Manaos, up, but they do not, and as they do not, they absolutely falsify the extraordinary principle the authors announce that ocean vessels seek inland ports.

Chapter 20.

Chapter 20 treats of the "problem of return loads." It is quite interesting, but foreign to the subject. Our Atlantic ocean ports for years (except during the war) have had and they will have a regular immense import commerce that will furnish all the full or nearly full cargoes for vessels of 10,000 cargo capacity and over, that is necessary to place them beyond the possibility of competition by the St. Lawrence, as an ocean route. The chapter itself is utterly useless as an aid to determining whether the proposed improved St. Lawrence route will be successful commercially.

Chapter 21.

We have here a chapter which considers the commerce of the Great Lakes. If we cut out the hyperbolic expressions used by the authors we may take their statistics as practically correct, but they prove nothing. However, it is noticeable that the immense tonnage of the lakes consists of bulk freight, iron ore and grain and that the export grain of the country does not compare with the domestic consumption; also that it can be carried much more cheaply from upper lake to Atlantic ports and thence to Europe, than by the Duluth-St. Lawrence-Liverpool route. As to iron, the authors forget to call attention to the fact that the tonnage goes to Lake Michigan and Lake Erie ports, where the ore is turned into iron and steel; ore comes from the east to Lake Erie ports also. The question of transportation is therefore one, not

of ore carriage, but of iron and steel. From figures we have given heretofore it is clear that the great mass of steel production of Lake Erie can be carried east by the Erie canal and that of Lake Michigan by lake and canal, for home consumption and export far more cheaply than it could possibly be by the St. Lawrence route.

From a quotation made by the authors they draw the inadmissible inference that one of the objects sought by the enlargement of the Erie canal was the diversion of iron ore from its present destination at Lake Erie ports to New York and New England. As one of those who for many years was engaged in urging the improvement of the Erie canal, I wish to say that no such idea ever entered the heads of the advocates of Barge canal construction. In asserting that the St. Lawrence route will furnish cheap means of transportation of ore to coastal points, the authors not only assume as a fact what is not so, but they absolutely omit to apply the principle that, so far as transportation is concerned, the most economical way of handling raw materials is to turn them into manufactured articles as near the point of production as may be economically possible. The application of this principle is the reason why iron ore is turned into iron and steel at the foot of Lake Michigan and at Lake Erie ports where the other necessary raw materials can be assembled more cheaply than at other points farther east.

The authors urge that coal can be carried to the eastern states and coastal points more cheaply by the St. Lawrence route and that therefore that avenue of commerce should be opened. This is amusing. What would those enthusiasts who have been misled into advocating the St. Lawrence scheme think of furnishing an avenue that would tend to divert coal to the east when they need it themselves in the west and northwest from Pennsylvania, the middle west and the southern states? The great rush of coal necessary to supply the west and northwest is up the lakes and not down. The great eastern mines supply the eastern states and New York and it is carried not only by rail, but by the ocean. The conclusions drawn by the authors from their arguments and facts in this chapter are baseless.

Chapter 22.

The authors here take up consideration of the volume of commerce affected by the Great Lakes-St. Lawrence waterway. They

might well have omitted the chapter, because the fact is that transportation by the Great Lakes-St. Lawrence Waterway will be so expensive that it will not affect any commerce or furnish relief to any appreciable extent. The argument is ingenious, but not to the point. It leads to this curious conclusion of the chapter, using the language of the authors, "*It is believed that the foreign and domestic commerce of the waterway within five years after its opening should amount to not less than twenty million tons per annum, with continued growth in the future.*" This is a roseate view, but it is a prophesy not likely of fulfillment.

Chapters 23 and 24.

These chapters need little or no comment as they relate to the movement of grain and other products and the figures given are probably correct, and the comments made by the authors are interesting. However, in the heading of chapter 23 I must acknowledge that Ritter-MacElwee prove their case. They say (discussing grain movement) "a saving in transportation of eight to ten cents per bushel, which is *clearly admissible by the use of the St. Lawrence Ship channel*, will be reflected in a substantial degree," etc. It might be said that the statement that the saving is clearly admissible by the use of the new channel expresses really a doubt in the minds of the authors, as otherwise they would not emphasize by the word "clearly" nor would they assert that it is admissible by the use of the channel. However, as they have said that a saving of 8 to 10 cents a bushel is clearly admissible by the use of the channel, all problems are solved.

Chapter 25.

This is a short but somewhat interesting chapter on ship-building on the Great Lakes.

Chapter 26.

This chapter relates to water-power and saving of coal. It ignores consideration of all the factors that the engineers, Federal and those who have appeared before the Commission, deemed essential. It may be remarked that the authors figure the horsepower which can be developed at four millions, but fail to state that of this the United States would secure only about 700,000

(as the fact is) and that that amount will not go to the benefit of the public generally, but to the building up of private interests.

I would call attention also to the fact that Ritter-MacElwee say that approximately two million horsepower will be in the international section. This shows the value of the figures which the authors give throughout the whole book, the moment they depart from authentic statistics. The horsepower in the international section, according to the engineers, will only be about 1,464,000, a slight difference between them and the authors, namely, 600,000 horsepower.

They also state that the value *at the switchboard* will be at least \$15 a horsepower. The cost of maintenance and transmission lines, and the loss of power in transmission for long distances would make the rate which would have to be charged for that horsepower, say in New York or Boston, or at any other point a few hundred miles distant, in order to make transmission profitable, greater than generation by steam at the points where power is used, so far as we can figure from the present state of electric science.

CONCLUSIONS OF THE AUTHORS.

Having got through with their arguments, the authors indulge in twenty-four conclusions, which of course beg the questions involved and amount to nothing more than the statements of propagandists, which have no solid foundation in the opinions, facts and statistics given in the book. The wind up of these conclusions is such a violent rhetorical effort on the part of the authors that it impresses the mind of the unbiased thinker with the idea that the entire book is not only a mere effort in the direction of propaganda, but that it is permeated with imagination, which they substitute in place of calm argument. No better illustration of the general character of the work and the fitness and fairness of the authors could be had than the final rhetorical flourish, quoted from a speech of a Senator from Wisconsin, and yet the International Joint Commission seems to lay great stress on what these incompetent, or unfair, writers have put in print.

REMARKS.

1. In treating of ice conditions I confined myself to those in the gulf and lower river. A dispatch from Canada, published in the papers of today (April 20, 1922), states that the Lachine

canal has just opened but that ice sixty feet thick will have to be removed below the mouth of the Soulanges before navigation can be opened. This shows that the ice condition will be a serious cause of delay on the canal sections of the improvement, both in the spring, at a time when navigation should open, and in the early fall, especially in severe winters. It is to be remarked that the sixty feet of ice that blocks navigation in the Soulanges canal has accumulated at the end of a mild winter.

2. The immense mass of commerce on the Great Lakes, east-bound, consists of grain and ore, westbound, coal. The coal traffic will continue to be carried on the lakes, as the material is needed for home consumption in the west and northwest. Ore will stop at lake ports where the great blast furnaces turn it into iron and steel. The iron and steel is manufactured in such tremendous quantities at Lake Erie ports that it certainly can go much cheaper in canal barges on that lake and the Erie canal for foreign export. Manufactured products are not now carried to any extent upon the canal, but they can and will be, by adaptation of barges navigating the improved Erie canal, carrying from one thousand to two thousand tons. There is no room for ocean vessels on the upper St. Lawrence and the Great Lakes.

3. Ritter-MacElwee talk of terminal charges. Those at Buffalo are not an obstacle in the way of cheapness by the Erie Canal route. Discharge for lake vessels is regulated by law and costs not over 7.75 mills per bushel for grain, including elevating and shoveling; trimming and harbor towing, \$9 and \$12 respectively for each canal barge, making an average of less than one cent and a half per bushel. The barges can deliver direct to the vessel at New York at comparatively small expense, or if the grain is elevated it can be done at little expense above cost, for the State is erecting a great elevator at that port that will compel private elevators to accommodate their charges to those of the State, and ocean vessels will be able to take grain directly from the State and other elevators at no expense except getting to the elevators and trimming. The above figures are based on the old system of placing the towing power in one of the canal barges; the more economical method which is now in use is by a tug towing a fleet of five or six barges. The tug will do all the river and harbor towing, cutting the figures given above for harbor towing practically in two.

An entirely new system for handling canal barges, known as the Donnelly system, is by electricity generated in a boat which transmits through cable to the barges ahead, each one of which can use the power for propulsion. Each boat has a storage battery which enables it to do all the moving about in harbor that is necessary. This system has been tested on a small scale with entire success and has met the approval of the Canal Conference of the State of New York. It will practically eliminate all harbor towing charges, as each boat will be independent, in port, and it will reduce the cost of carriage greatly. I cannot give exact figures on this because the system has not yet come into use.

4. The figuring of the authors on their typical trip is upon an entirely false basis, as it includes a voyage and return. The figure I have given on lake carriage, seven-tenths of a mill per ton mile, is based on yearly earnings, which are averaged. The per cent is too high, but I retain it to give Ritter-MacElwee the advantage of outside figures. The fact is that even with the present high cost of wages of officers and crew, fuel, supplies, etc., a ten thousand-ton lake vessel can today carry wheat at $2\frac{1}{8}$ cents per bushel, Duluth or Chicago to Buffalo, and pay 8 per cent on the capital investment, with the usual allowance for depreciation. These figures are furnished me by a member of a firm which owns and operates quite a number of vessels and they are based on present costs of operation in the light of years of experience, they take care of depreciation and pay 8 per cent on investment, and therefore show a reduction in the cost per ton mile very much below the seven-tenths of a mill I have adopted. My figures, Buffalo to New York and New York to Liverpool, I have been compelled to adjust on the return trip basis, because I have not had the time to give the facts as to cost upon the usual basis. They are, however, as fair as the Ritter-MacElwee method. One thing is apparent from this method of figuring, that is, that statistical figures do not give the real business results. No prospective investor in vessel property would accept any such juggling as the authors indulge in, nor, indeed, would they be entirely satisfied with the figures I give; before investing they would make full inquiry as to the nature of the business, the prospect of keeping vessels busy, cost of operation, etc., items of knowledge necessary from a business point of view, in order to come to a conclusion as to whether the business would pay at all. Such a method of procedure would

exclude investment in the typical vessels (7,500 cargo tons) adopted by Ritter-MacElwee.

These considerations show the utter fallacy of the propaganda book. As an illustration, a prospective investor would want to know what he was going to do with his typical vessel after it had made its four St. Lawrence-Great Lakes trips. He would find that while his vessel was making the four round trips, the trips that could be made by a lake vessel and by canal barges, Duluth to New York, would be about fourteen during the season of navigation. He would also find that his 7,500 cargo tons boat during the rest of the year would have to compete with the much larger carriers on the ocean and that he could not do this successfully. He would also find that his vessel could not engage in our coastal trade unless it was of American registry; but the new route will attract foreign vessels (which can be built much cheaper than American) if it can be successfully used, and consequently he would have to invest in American vessels to engage in the coastal trade at much greater cost per ton than he could build ocean carriers of much larger capacity to engage in ocean commerce simply, with greater profits.

It may be urged that lake vessels and canal barges would be idle for about five months. This is not correct. Lake vessels, by the new channel could readily go to the coast at the close of lake navigation and engage in the coastal trade, and so could the modern canal barges engage in the interior coastal trade, which would employ them from Boston to at least as far as Norfolk, Va., by way of Long Island sound, the Delaware and Chesapeake canal and Chesapeake bay, as soon as the new Raritan canal is constructed or the present one improved. Right here I wish to say that this much needed connection, the Raritan canal, will be thrown into the background for many years if the almost useless St. Lawrence scheme is carried out. Canal barges could also engage in lighterage at New York, Boston and other ports and in the coastal trade between New York and Boston.

5. It is interesting to compare the saving in cost of the southern route over the St. Lawrence route, based on the number of trips that can be made during the navigation season of the latter route. At the cost as figured on the St. Lawrence route the typical vessel would make four trips, carrying in all (if she had full cargoes one way and a third of a cargo the other) 40,000 tons, while the lake, canal and ocean carrier, in the fourteen trips

they could make during the season of navigation on the lakes, would carry over 120,000 tons, Duluth to Liverpool, figuring one-third capacity return cargo.

The authors figure the cost per ton of the typical cargo at \$8.13 for the round trip. This is incorrect, because in their figures they make no allowance for the excessive delay to ocean vessels in loading and unloading on the Great Lakes, which would make the true figure about \$9 per ton. The typical vessel would therefore carry her 40,000 tons at a cost of \$360,000, her expense during the time she could use the St. Lawrence route. On the other hand, on the New York route, on four trips during the season of navigation (to compare with the typical vessel) there would be carried 40,000 tons, Duluth to Liverpool, and 13,334 tons westbound, in all 53,334, and the cost for the distance would be \$2.85 a ton eastbound, or \$114,000. On the westbound cargo the cost per ton would be the same per mile, but the cargo would be only 13,334 tons, which would bring the mileage cost up to \$8.55 per ton of cargo, or \$114,000. This makes the entire cost, via the New York route, \$228,000. We thus find the New York route would carry on four trips 13,000 tons more of cargo at a saving in cost of carriage of over \$100,000. It would be well for our western friends to consider whether, if they could, they would put ocean going vessels in competition with lake vessels for four round lake trips during the season of navigation, at a great excess of cost, and then have to rely upon lake and canal carriers making as low rates thereafter as they could afford to carry for if they had the entire season without competition. There is another consideration arises here. The lake-canal trade should be fostered in the interests of the middle, northwest and western States, in order to keep down cost of carriage by that route, because that route will serve them for about seven months each year, making at least fourteen trips, whereas the ocean vessels can only make four.

6. I would emphasize the fact that on my excessive figures, lake vessels can carry grain at 2.1 cents per bushel, Duluth to Buffalo, and that they are assured during the season of navigation of up coal cargoes, which helps them to make the low cost of carriage, an advantage which ocean going vessels could not secure unless they confined their commerce to the lakes. Further, the Barge canal can carry grain, Buffalo to New York, at 1.2 cents per bushel, and the ocean carrier can carry, New

York to Liverpool, at 5.25 cents per bushel, making a total of only 8.55 cents per bushel, Duluth to Liverpool via New York. Ritter-MacElwee give the rate on their typical vessel as 16.4 cents a bushel. Surely the terminal charges for transshipment at Buffalo and New York will not come anywhere near making up this amount. Therefore, it is plain, making all allowances for the difficulty of arriving at accurate results from mere statistics, that there is a very great advantage in the cost of carriage in favor of the New York route.

7. In critically examining the Ritter-MacElwee book, I have used statute miles and in giving figures of cost of carriage, etc., I have not assumed anything, as the authors do, but have used figures which have been verified in the past by actual experience and figures as to rates, insurance, etc., which are furnished by those who know their correctness as exemplified in the conduct of their business.

8. As to insurance I would call attention to the fact that the rate west of Montreal for ocean vessels cannot be ascertained, because they have never navigated those waters, but it will undoubtedly be higher than on lake vessels which are modeled for peculiar adaptation to that class of navigation. The rates on the Erie canal are in an evolutionary condition. Today they are quite high, because, owing to the delay in completing the Erie Barge canal (1903-1918) very few boats for the navigation of the canal were constructed, inasmuch as the character of the boats that could be most economically navigated upon completion of the Barge canal in the various classes of trade, could not be ascertained, and an investment of capital in boat building, before completion, would be simply waste. During the war, the Federal government discouraged commerce on the canal by the exercise of its power over traffic, which not only prevented the building of boats by private enterprise, but almost killed canal commerce. The result has been that many of the old 240-ton boats have gone completely out of commission, others have grown old and are really not first class carriers of grain, having been more or less repaired and patched up. Now private capital is seeking investment in modern Barge canal commerce and companies have been formed to construct the large tonnage canal barges. These barges will carry over a thousand tons, probably 1,500; they will be built of steel and will be in every respect as safe marine risks as exist; they will navigate safe waters, thus making the hazard greatly

less than those on the ocean, the upper St. Lawrence River and the Great Lakes. As these new Barge canal boats enter upon the trade, the insurance rates on the canal will fall to the minimum, and the rates which obtain upon the old boats will cease to exist in the grain trade. At present there is no general canal insurance rate. The underwriters fix rates on grain with a view to the condition of the particular boat or boats and the nature of the cargo. Insurance men are looking to the construction of the new canal barges and their proper classification, some of them advocating three classes so as to differentiate the different types and urging that only the best and most seaworthy boats be used in the carrying out of high class cargoes.

THE REPORT OF THE COMMISSION.

It is very important in weighing the conclusions of the International Joint Commission to consider their sources of information (personally they had little or no knowledge of the subject), because their conclusions rest on general information. These sources are the report of the engineers, the MacElwee book and partisan statements of advocates at public meetings. I wish to say that statements made at public meetings, unless they come from unbiased persons, competent to understand the subject as to which they speak and having knowledge and training to make their opinions worth something, are of little or no value. I speak not only from general knowledge, but from actual experience on the International Waterways Commission. We held a number of public meetings in Canada and the United States at which very important questions were considered, and the information which we obtained, and the opinions which were entitled to any weight were few and far between; there were always two sides represented and partisan statements which did not bear the test of our own investigations filled the air. We laid little or no stress on what the partisans said in advocacy of their views and regarded the public meetings as valuable only for the purpose of trying to test what people wanted, not what should be done. There were a few exceptions where competent engineers appeared and were able to furnish us with data which we could use, after investigation, to advantage; but we made our own investigations and based our conclusions on them, with the help of the data so furnished.

The International Joint Commission, however, has relied upon the untested report of the engineers, the partisan book which I have discussed that is worthless so far as furnishing data to test the questions here involved is concerned, and what was told them by various people at their public meetings.

It would seem, therefore, that the foundations on which the report of the Commission rests are unstable and utterly insufficient to support the superstructure that they erected thereon. To be plain, I am most decidedly of the opinion, as I think all unbiased investigators must be, that the International Joint Commission has hurried its work and has been influenced more by the outcry said to be that of sixteen or eighteen states, than it would have been if it had fairly investigated, upon its own responsibility, by consultations with persons versed in the operation of trans-Atlantic steamships and conversant with world commerce and with navigation. So far as settling any of the questions which must be settled before any action is taken, the report has the nature of a set of conclusions carelessly arrived at and it is absolutely of no value.

For the purpose of examination, the report may be divided into three parts. The first includes what the commissioners gathered through public meetings, and otherwise; the second covers conclusions arrived at, and the third, recommendations.

As to the first division, it is sufficient to say that the statements in the report, aside from what is largely historical and descriptive (matters of general information), are devoted to what occurred at public hearings and references to the engineers' report. As to the latter I would say that I regard it as fully covered by what goes before in this paper and add that it forms no basis whatever for even an approximate estimate of cost. The rest of this part of the report relates to what was said and produced at public hearings, and that, as I have heretofore stated, is of no value because it is partisan and not expert. However, it is to be remarked that the commissioners several times refer to and seem to lean upon the Ritter-MacElwee book, which is worthless as a means of accurate information respecting the real questions involved. This subject I have treated above. I would also call attention to the fact that careful reading of this part shows distinctly a bias upon the part of the commissioners which should not have existed. An evidence of this is that particular prominence is given to statements of individuals who appeared before

the Commission advocating the canalization scheme, and the facts presented by those who oppose that scheme are very lightly passed over. This prominence given by the commissioners to the statements of the improvement enthusiasts quite plainly shows that they did not make non-partisan investigations, by calling in those personally engaged in world commerce, in navigation, and in the operation of sea going and lake vessels and canal barges, which they should have done if they desired to secure information which would enable them to come to intelligent and correct conclusions. Perhaps they did not give weight to the advice of any experts they may have consulted. Another evidence of bias is the effort made by the commissioners to explain away the Canadian situation, because in Canada the sentiment is certainly not favorable to the canalization of the St. Lawrence; their attempt takes them into a region which the questions put to them by the two governments do not ask them to explore; they had nothing to do with the question as to whether Canada was agreeable to the scheme or opposed to it — that is a phase of the matter not referred to them and wholly within the province of the State Department. Why the commissioners took this matter up at length is inexplicable, except upon the ground that they did not wish Canada's opposition to be considered by Congress. The information they give on the subject is not of any value to the State Department, for if it were thought wise to negotiate with Great Britain, that country would refer the entire matter to Canada and thus obtain accurate information for the use of both governments in accordance with diplomatic usage; the result would be decisive as to whether a treaty could be negotiated or not.

In their general discussion the Commission indicates that it is governed to some extent by inclinations, for it says (page 9 of Part VI of Senate Document No. 114), "the Commission is inclined to agree with the statement that where there is a productive interior ships will proceed as far inland as physically practicable." I have covered this subject fully in discussion of the Ritter-MacElwee book, but as the commissioners have included the Rhine, the Danube, the Columbia, the Willamette and the Delaware in addition to those named by the authors of the book, I would call attention to the fact that Ritter-MacElwee evidently do not think these rivers fair examples. Probably the reason was that the Delaware, with the improved channels, fur-

nishes a safe and comparatively short route from Delaware bay to Philadelphia, a great commercial port, and the lower Mississippi is a like case; the Danube is a tremendous stream of very great length, and yet no attempt has been made to adapt it for ocean-going vessels except to a point to which ocean vessels of a comparatively small cargo capacity proceed inland for about 100 miles; what is true of the Danube is true of the Rhine. The Rhine is navigated by barges from the three great ports, Antwerp, Rotterdam and Amsterdam for its entire length and no effort has been made to improve it for any distance above those ports to accommodate ocean vessels. The inclination of the Commission to agree that where there is a productive interior ships will proceed inland as far as physically practicable has no justification whatever in experience. Ocean vessels navigate waters only where they can make it profitable and more profitable than by the navigation of other waters. The Commission ought not to have indulged in such inclinations.

There are other loose remarks of the Commission upon important questions throughout its general discussion that will not bear examination in the light of the principles and actual facts governing ocean commerce. But it will take too much time and would throw no more light on the course pursued by the Commission to discuss each one separately. However, I would call attention to a statement made by the Commission in its report that the cost of construction of lake vessels is \$120 per ton and of ocean vessels \$140 per ton and *that they, in substance, think this cuts no figure in determining whether ocean vessels will navigate the channels.* This looks like carelessness, because the amount of capital invested is a serious factor in determining what commerce vessels will engage in, as that is a prime factor in measuring receipts over expenses and determining whether any particular line of business will pay. I would add that it is of particular importance here, because there are enough modern lake vessels in actual commission on the lakes to care for the entire commerce and that those vessels represent a cost of construction very much lower than the cost today; whereas ocean vessels will have to be adapted to the navigation of the new channel, and new construction at the present high cost will have to be undertaken. In other words, it will be cost of construction of lake vessels at rates obtaining before the war and, largely cost of construction of ocean vessels at present rates. It would seem

to the unbiased mind that this is a very important factor in passing upon the comparative cost of transportation upon the two routes, and therefore upon the probability of ocean vessels navigating the proposed channels.

CONCLUSIONS.

In examining the conclusions of the commissioners one thing is apparent and should be kept in mind; taken as a whole they show positively that the commissioners did not devote their time to proper investigation of the great basic principles on which the problems to be solved rest. They say in their report, substantially, that the report of the engineers is of such a nature that it cannot be relied upon, and they also disclose in their conclusions an utter disregard of the economic principles that should be applied to the problems before them and that are necessarily decisive, one way or the other, of the character of the answers they are called upon to give to the questions submitted to them.

I would here reiterate that the questions involved are not whether ocean-going vessels *can* navigate a canalized St. Lawrence, the Welland canal and shallow channels of the Great Lakes, improved or not, but whether ocean-going vessels *will* engage in commerce between the upper lake ports and trans-Atlantic ports. A decision upon this question seems to have been assumed by the commissioners as a matter largely of guesswork, and they have guessed, practically basing their determination upon the ground that ocean-going vessels of 30-foot draft or under *can* navigate the waters mentioned. Of course this is not true unless the channels are made at least 30 feet deep, which is evidently the basis on which the commissioners proceed. The real question is one of business in commerce. Owners of vessels would put them on wheels and run them on land if they could make more money than they could by navigating them on water. But will they navigate the dangerous, narrow, and for the great part of the length, shallow channel, with all the delays of such navigation and with reduced cargoes as compared with ocean carriage, competing with the Great Lakes, Erie canal, New York route and the railroads when we have a return to normal business conditions? The commissioners seem to have been obvious to the decisive factors, although those opposing the scheme presented to them authentic information on the subject.

The commissioners also are at fault for hastening to recommend a treaty for the purpose of constructing the canal. Whether this is the result of bias or not is not ascertainable.

The entire report shows that the engineers' plan is utterly insufficient to enable anyone to estimate the cost with any approximation. This cannot be done until the question is settled as to what draft will induce ocean-going vessels (if they can be induced) to engage in commerce upon the Great Lakes and between them and trans-Atlantic ports; the depths of the channels must be ascertained before engineers can prepare a satisfactory plan, and a satisfactory plan must be prepared before cost can be estimated. The commissioners say there is no satisfactory plan and yet they urge the making of a treaty. To say the least, this makes the conclusions worthless.

We must first determine whether ocean vessels will engage in the trans-Atlantic-Great Lakes trade, then the cargo capacity of the vessels that may be induced to engage in that trade, then the depths of water they will require, then we must have a plan on which cost can be estimated with some precision, then we must have a thorough investigation of the benefits to be derived by the United States as a whole, as compared with the estimated cost. If vessels cannot be induced to engage to any extent in the trade, no matter what depth is furnished them, or if vessels of small capacity can alone be induced to engage in the trade, the work should not be undertaken, for vessels of small capacity cannot compete, because the limitation of capacity with the delays in the navigation will compel them to charge rates which will be prohibitive. If, however, vessels of as great capacity as those carrying to and from our great Atlantic, Pacific and Gulf coasts could be induced to undertake the extremely difficult, dangerous and slow navigation of a canalized St. Lawrence, the Welland canal and improved channels of the lakes, and if their doing so would greatly encourage and expand the agricultural, mining and other industries of our west, middle west and northwest states, and if this could be done at an expense that would not be so large as to be prohibitive, and if it would not delay or extinguish the efforts that have for so many years been approved by Congress, in the direction of benefiting the entire United States by the improvement of harbors, of inland rivers and other waters and the furnishing of adequate water terminals, then the proposed improvement might possibly be

undertaken. The commissioners, by their report, do not solve and do not seem to attempt to solve any of the questions suggested; what they say amounts simply to this, vessels can navigate the new channels drawing thirty feet or under, and, therefore, a twenty-five-foot channel should be provided. I leave it to any intelligent mind to determine what such a report is worth, either as furnishing information from which conclusions can be drawn, or as giving any weight whatever to those which the commissioners drew.

CANADIAN CANALS.

The commissioners recommend that the new Welland Ship Canal be made a part of the scheme of improvement. This means that the United States shall undertake to pay a part of the construction of a ship canal across the Niagara ridge in Canada. I can imagine no possible reason for doing so. This is as much a work for the benefit of Canada as the construction of the Erie Barge Canal was for the benefit of the United States. The new Welland Ship Canal is an undertaking of Canada already entered upon, and why we should help Canada pay for it is inconceivable. The improvement of the canal was entered upon by Canada for the purpose of expediting the carrying of grain from the Great Lakes to Montreal for transshipment. The plan for improvement conditionally approved by the commissioners includes not only the new Welland Canal, but thirty-four miles of canals wholly within Canada, which will furnish Canada with splendid waterways for reaching Montreal. Just why we should do this is impossible to divine. The United States should not enter upon a plan for the improvement of all waterways between Montreal and Lake Erie the advantage of which will be for the benefit of Canada alone, even if the improved channels and canals should be utilized to some extent by small ocean vessels in the ocean and lake trade. The Commission is inexcusable in proposing to spend hundreds of millions of dollars upon such a project.

INCONSISTENCIES.

The Commission proposes as a basis for the proposed works, the report of the Engineering Board and adds, "before any final decision is reached the Report of the Board," together with other material should "be referred back to the Board enlarged by other leading members of the engineering profession, to the end that the

whole question be given that further and complete study that its magnitude and importance demand, and that after completion of a plan the administrative features of the improvement be carried out as set forth in recommendations 7 and 8." In other words, the commissioners recommend a treaty, then say there is no basis on which to determine whether a treaty should be entered into, nor what should be included in it, and then recommend a further and complete study of the question of the method of improvement; all this before anything is done from which it can be determined what the cost will be, what the advantages will be and whether it is wise to negotiate a treaty on the part of the United States. This seems to be an inversion of all diplomatic and business principles. Nations do not enter into negotiations for treaties until they have, or one of them has, determined what is to be negotiated, and whether it is worth while to seek a treaty upon the special subject; in business, before an adventure is entered upon the business man seeks to find out whether it will be profitable before undertaking to construct a manufacturing plant or to secure a stock of goods for sale.

ADMINISTRATION.

Recommendations 7 and 8 referred to above are that where navigation works do not lie wholly within one country, and cannot be economically constructed, maintained and operated as independent units, construction maintenance and operation shall be by an international board, and that where such works lie wholly within a country and can be constructed, maintained and operated as units, that they be constructed, maintained and operated by the country in which they are located, with a right to inspection by the international board. This emphasizes the international complications that will be created if the scheme outlined by the commissioners is carried out. One set of works, those at Cornwall and up stream, will be constructed, maintained and operated by an international friction board and all other works will be consigned to the absolute control of Canada. If it were intended to create causes of dissension between the two countries, no plan could have been more successfully contrived for that end. Canada will be given a fine set of canals and channels within her own territory and will have entire control of them because they will be independent units and these channels will be used, not merely for through commerce, but for Canadian

commerce also. Which is to be given the preference upon occasions as they arise, the through or the Canadian local commerce, the through United States or the through Canadian commerce? What regulations can be made to control this and how can they be enforced, if Canada sees fit from time to time to show a preference for her own interests? No regulations can control this situation for there will be no power to enforce them, even though there be an international board having control of the channels from St. Regis to Lake Ontario, because such a board cannot be given sovereign powers.

FLOWAGE.

The commissioners recommend an exhaustive examination of the extent and character of damage by flowage. This is an essential in determining cost and even the engineers do not attempt to give figures upon it. The "exhaustive investigation" should be undertaken and completed before an estimate of cost is made and before Congress and the Executive can determine whether it is wise to negotiate a treaty to carry out the scheme. The same remarks apply to this recommendation as those I have made in the case of the investigation to arrive at a plan.

BOUNDARIES.

The commissioners also recommend a readjustment, by conveyance from one nation to the other of any acreage of submerged land that, by reason of whatever plan is adopted, is necessary to bring "each of the power houses" within the boundary of the country to which the transfer is made. Not only is this recommendation made without any plan, but it involves the adoption of a scheme that will result in the readjustment of the boundaries. How far reaching this recommendation is no one can tell. Why the commissioners speak of a transfer of "slight acreage" is a puzzle, because the amount of acreage that would have to be transferred to accomplish such a purpose cannot possibly be ascertained until a definite plan is agreed upon. It cannot sensibly be said to be "slight."

POWER COSTS.

The Commission recommends that power works be built, installed and operated by and at the expense of the country in which they are located. This is practically a recommendation

that the power to be generated go to the country in which it is generated. It leaves matters just as they exist today, because each country can now install power works within its own boundaries, but if it does so, it will be at its own cost, and when it does it will get the power. The only place where power works may be constructed which will not be wholly located within one country, is in the neighborhood of Cornwall, although the plans of the engineers show the power plants there and above wholly within the United States. The result of this is that Canada, by the construction of navigation works below St. Regis, would be put in a position where she could to great advantage develop several million electric horsepower in her own territory. Why the United States should enable Canada to secure this advantage I cannot see.

COST APPORTIONMENT.

When the Commission comes to dispose of the cost, it presents a loose and general plan. I will not take the time to discuss this, but will simply say that the basic idea is that the cost shall be apportioned in accordance with the benefits each country receives. How the benefit is to be ascertained is not even suggested. The exception to this is that commencing five years after the completion of the work the ratio between the countries is to be determined "upon certain known factors," of which illustrations are given, among others, developed resources and foreign and coastwise trade of each country within the territory economically tributary to the proposed waterway. Here is another source of dissension between Canada and the United States. How are the benefits up to five years after completion to be determined and how is the ratio after that period to be? The elements included are too indefinite and vague to be trusted to any commission or board. The confusion is added to by a provision that the ratio shall be readjusted every five years and based upon the freight tonnage of each country actually using the waterway during the preceding five-year period. Here we get something more definite, but the result is that the United States will not get out by paying one-half of the cost, because its tonnage on the waterway, if it is used to the extent the enthusiastic advocates of the scheme claim, or to the extent that would make the improvement advisable when cost is considered, would vastly exceed that of Canada; it might even rise above three-fourths of the entire tonnage, a certain result

if the coasting trade of the United States used the improved channels of the St. Lawrence, as those enthusiasts claim it will. But the commissioners add, upon the subject of division of cost, that the cost of "navigation works" for the combined use of navigation and power, above the cost of navigation alone, is to be apportioned equally.

ANSWERS TO QUESTIONS.

Before considering these answers I would premise that many of them could have been answered without any investigation and that those requiring investigation are answered without a sufficient basis for giving any answers at all.

The answers to the subdivisions of question I, until the commissioners come to the draft of water and estimated cost, are not objectionable nor irrational. The draft of water is recommended as twenty-five feet in the canal and thirty feet on the sills of the locks. I have shown that there is no hope of competition with the New York route by light draft ocean vessels and that with twenty-five foot draft such vessels could have not over twenty-three foot cargo draft and make even the slow speed (not exceeding four miles an hour) necessary in the canal sections. The commissioners' plan looks to thirty feet eventually by providing that depth over the lock sills, and thus reduces the matter to an experiment on twenty-five foot channels. This ought not to be done. If the canals are to be constructed they should be made thirty foot draft on the start as this can be done much more cheaply at the time of construction than afterwards when the twenty-five foot proves utterly insufficient. Any engineer acquainted with such work will admit this.

The commissioners estimate the cost of constructing works between Montreal and Lake Ontario at \$252,728,200. This is simply a parrot-like repetition of the estimate of the engineers, whose plan is confessedly utterly insufficient as a basis for determining costs. Such a statement is reckless.

The commissioners again urge that the United States pay its proportion of the Welland canal improvement, by saying that that cost should be added to the total given above. That the United States should pay any part of the enterprise which Canada has already undertaken, so long as it pays its proportion of the rest of the work not yet undertaken, no taxpayer of the United States will admit.

Answering question II the commissioners simply recommend further study of plans for construction, before anything is done. This condemns their recommendation for a treaty because cost and benefits must be ascertained before Congress or the Executive should take any action whatever.

Question III is unobjectionable so far as it contains an answer to subdivision a; so far as it purports to answer subdivision b, administrative features, reference is made to my discussion of the recommendations.

Answers to questions V and VI require no special discussion here as I have already considered them.

In answering question VII the Commission says that in its opinion regulation of Lake Ontario will increase the low water flow in the St. Lawrence Ship channel below Montreal, but the extent of the increase can only be determined by practical experience. So far as practical experience as a test is concerned, the answer is right; the opinion of the Commission is not based upon complete or sufficient hydraulic engineering grounds and is worthless.

In answering question VIII and IX, which are whether the improvement will develop resources, commerce, etc., and whether traffic, incoming and outgoing, in kind and quantity is likely to be carried both at its inception and in the future, the commissioners naively admit that "it is impossible" to answer each question specifically, and they cover their retreat by referring to their general report on conditions existing and expected. How under such circumstances the Commission could bring itself to recommend the negotiation of a treaty, and, practically, the entering upon the project, is past understanding. It should have reported that as it was impossible to estimate cost and advantages, further time should be given to make the necessary investigations through the proper experts before the commissioners were required to give specific answers to the questions propounded. This they did not do and it shows conclusively that the preconceived idea that the St. Lawrence should be canalized was alone the governing factor that resulted in this report.

RESULTS.

The commissioners confess that they did not have before them sufficient engineering data, nor sufficient reliable information on the economic problems involved to enable them to report in favor

of a plan of construction most beneficial for navigation and electricity generation, upon the benefits that would be derived from construction, nor upon the benefits to traffic, and yet, in the absence of needed information upon these points they recommend a treaty. They might as well have said that the agitators of the scheme were good American citizens, represented strong political elements in the United States and in Canada and therefore they should have what they wanted, without regard to costs or benefits. I do not accuse the commissioners individually of being influenced by politics, but I cannot avoid coming to the conclusion that the political situation was a strong factor in producing such an absurd recommendation as that a treaty should be concluded before determining the cost and whether beneficial results would accrue to the entire country and be so great as to warrant the tremendous expenditure which it is acknowledged would be involved. The absurdity of such a recommendation, in view of the entire report, is clear and it would seem that it should have been apparent to the commissioners themselves. What intelligent men, unbiased by preconceived or political considerations, would have done would have been not to recommend a treaty, but to extend the other recommendation that further engineering investigations should be made and that information should be obtained from those engaged in commerce upon the Great Lakes, the St. Lawrence, the Erie canal and the ocean as to the probability of ocean vessels being able to use the proposed channel and reduce the cost of carriage from the upper lakes to Europe and *vice versa*. They should have confessed that there was not sufficient material before them to answer the questions propounded to them with sufficient certainty to enable Congress and the Executive to determine whether they would take action without further investigation.

The Executive, if it acts upon this worthless report and attempts to negotiate a treaty at present, will be disregarding the interests of the entire country and running the risk of uselessly loading upon the shoulders of our overburdened taxpayers a great increase of taxation and it will also disregard the danger of postponing for years the proper improvement of our inland waterways and our coastal harbors. It would seem that the duty of Congress, under the circumstances, is to take up the matter through unbiased special committees and make a thorough investigation before taking any action, and before doing this, to rele-

gate technical questions to a properly constituted board of engineers under the management and control of the War Department. In the meantime the Executive should await results.

NOTES.

1. A recent associated dispatch from Kansas City illustrates plainly the character of the so-called arguments used by the enthusiastic advocates of St. Lawrence canalization before the commissioners, and as it characterizes the mass of material (in addition to the Ritter-MacElwee propaganda) on which the commissioners undertake to recommend a treaty, I deem it proper to refer to it as a characterization of the commissioners' information on the subjects before them. Mr. Walter S. Dickey at Kansas City indulged in the usual crude rhetorical arguments, baseless so far as knowledge of the navigation and other economic questions involved are concerned. It is quite evident that Mr. Dickey knows nothing about the subject. On the basis "of bringing the ocean up to Great Lake ports" he states, in substance, that the Liverpool market determines the price of wheat and that consequently "when you save twenty cents a bushel on transportation costs, the producer gets the whole saving because none of it goes to the middleman." Mr. Dickey probably never has investigated the difficulty of bringing the ocean to the lake ports, nor has he investigated the handling of our grain products in the market, nor has he investigated the question whether there will be a reduction in transportation costs. Probably he is not qualified to pass intelligently upon these subjects. I believe it to have been incontestably proved by past and existing conditions in commerce, navigation and trade, that in a commercial sense the ocean cannot be brought to the upper Great Lakes ports, that transportation costs on the proposed route would be greater than the existing water routes, and therefore canalization of the St. Lawrence will afford no relief whatever, but, on the contrary, will tend to greatly injure the Mississippi valley commercial interests and postpone for many years the proper improvement of the Mississippi and its tributaries and the furnishing of efficient water terminals. When Mr. Dickey speaks of saving twenty cents a bushel on transportation cost he ventures into the realm of excited imagination, for there would be no saving if present conditions and past experience are to be relied upon and there certainly would not be a modicum of twenty cents a bushel saved.

That statement is ridiculous, because the actual costs from Chicago or Duluth, via the Lakes, Canal and New York route; is only in the neighborhood of 8 55/100 cents a bushel. We meet the astounding proposition that on the new St. Lawrence route, in order to save twenty cents in the cost of transportation, the carriers would have to charge nothing and donate 11 45/100 cents a bushel to the farmers. As to the middlemen getting nothing of the saving, we have another ridiculous assertion. Whether Liverpool controls the world market prices or not, it does not control the method of marketing grain in this country. The farmer is compelled to resort to the railroads to get his grain to shipping ports on the lakes and when it gets there it is in the hands of the shippers and not the farmers, they paying the prices which are made in Chicago and New York for purposes of purchase and shipment to cover the additional cost and profits of the shippers. Talk of the kind indulged in by Mr. Dickey is trash, but it is used by the agitators to secure support that it was supposed would have great political influence, and it was used before the commissioners with the absurd idea that they would regard it as supplying real information; it is dangerous but not sensible.

2. It is worthy of consideration that rather than undertake the costly and practically useless canalization of the St. Lawrence, it would be well to construct the projected Barge canal from the foot of Lake Michigan to Toledo, which has heretofore been officially reported upon quite favorably. Such a canal would enable barges of at least 1,500 tons to carry grain and other commodities from southern Michigan lake ports and interior Indiana and Ohio freights direct to New York, and it would cut off transfer charges. The cost would be small as compared to that of the St. Lawrence route and it would take care of tonnage which the railroads in their present congested condition cannot economically handle.

3. Another illustration of the character of arguments made for canalization is found in a speech made by Senator Pomerene before an association of credit men in Ohio. The speech as a whole is a reiteration of false and unreliable data and facts which have no real bearing upon the problems to be solved. One statement, however, is worthy of special mention. The Senator says "Damages, of course, should be paid to Canada for the four existing canals which will be put out of commission. This

amount is not included in the cost as stated, nor for certain charter rights of the New York and Ontario Power Company." This goes way beyond the Commission's recommendations that we pay for a part of the cost of construction of the new Welland canal. Senator Pomerene would have us pay for the damages to Canada on account of four existing canals and in addition supply Canada with other and very much better canals and channels which take their place, to say nothing of our paying for power which Canada will get. Again, I would say that such a proposition will hardly appeal to the taxpayers, certainly it does not appeal to reason. It is like making an exchange of articles in business and then paying the one who benefits the value of the article he gives in exchange. In other words, A and B swap horses, A gets a much better horse than he gave B, therefore B ought to pay A the value of the horse A has turned over and let him keep the horse B has given him. On such material do the agitators for St. Lawrence improvement rely.

4. I cannot close without giving due acknowledgment to Mr. George Clinton, Jr., for the great aid he has given me in securing accuracy of data and figures and in clarifying argument. His aid has not only enabled me to save a great deal of time, but has undoubtedly prevented many inaccuracies.

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